Gleanings in Bee Culture

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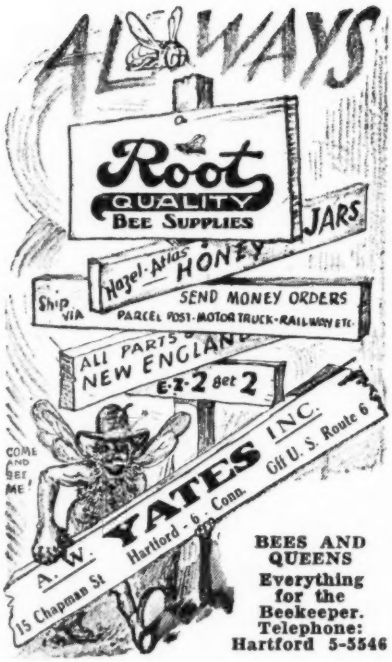

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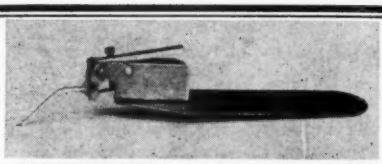

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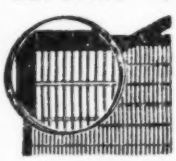

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FEDERAL Work in Apiculture

Reported by ROGER A. MORSE

FEDERAL RESEARCH in apiculture has progressed considerably since the time of Nelson W. McClain, first federal apiculturist. In 1885 when McClain, a disease specialist, was appointed for a six months' period, foulbrood was the major problem of commercial beekeepers. Evidently it was felt that the services of an apiculturist were not badly needed, for it was not until 1891 that the appointment was again filled, when Professor A. J. Cook, of Michigan, and Mr. J. H. Larrabee, of Vermont, served together for another six months' period.

By 1891 Professor Cook was well known for his work in entomology and apiculture. He had assumed the duties of Professor of Natural History at Michigan Agricultural College in the late 1860's. Cook, in fact, was the first college teacher in both entomology and apiculture in the United States. His book, "Manual of the Apiary", published in 1876, was the first college textbook in apiculture, and went through many reprintings and editions before Cook's death. Larrabee was a commercial beekeeper from Larrabee's Point, Vermont. Together they worked on disease and management problems. Larrabee was especially well-known for his writings on beekeeping published in the **Bee-Keepers' Review** and the **American Bee Journal.**

It was not until July 1, 1891, that Frank Benton was appointed permanent apiculturist for the Government. Benton had begun his studies in apiculture under Cook in 1870 at the Michigan Agricultural College.

About 1880 Benton went abroad and established a number of apiaries from the island of Cyprus to the heart of the Carnic Alps at Laidach and Krainburg. He was abroad for nearly

U. S. Beekeeping Specialists. L. to r. W. J. Nolan, Head of the Section of Bee Culture Research; Albert S. Michael and Melvin Abramovitz, bee disease microbiologists; Jay C. Keller, Editor of the U. S. Semi-Monthly Honey Report; Miss Julia Merrill, Librarian of the National Beekeeping Library at Beltsville. Md.; James I. Hambleton, Chief of the Division of Bee Culture and Biological Control; and Harold Clay, Honey Marketing Specialist of the U. S. Department of Agriculture.

The late Dr. E. F. Phillips, first chief of the Apiculture Section of the U. S. Department of Agriculture.

ten years and built up a considerable reputation from his work on various races of bees.

Benton also became widely known for the queen mailing and introducing cage which he invented, and which is still in wide use by queen producers today. During his term of office he spent most of his time in this country, where he was responsible for the importation of many races of bees for experimental purposes. Benton served until 1905 when Dr. E. F. Phillips was appointed as acting head of the apiculture section in Washington. Phillips' position was made permanent in 1907, and under his direction there was a rapid expansion of the research work in beekeeping, especially as related to bee disease and management.

A shortage of sugar during the first World War created an increased interest in beekeeping, and under Phillips' direction various methods of management were studied. At the time there were few state apiculturists, and, as a result, much of the early work carried on from Washington was of an extension nature. Phillips continued in charge until 1924, when he was appointed Professor of Apiculture at Cornell University. He was succeeded by Mr. James I. Hambleton, who has remained in charge since that date. Under Hamb!eton's direction and especially during World War II, pollination studies were greatly increased.

One very important contribution coming from the Beltsville station was USDA Circular E-584, entitled "The Dependence of Agriculture on the Beekeeping Industry". In this paper are listed the various agricultural crops which require pollination. Recent pollination work a!so has stressed the fact that wild pollinator populations are steadily decreasing. This, together with a more intensified agriculture, has brought about increased interest in the honeybee on the national level, and has resulted in the recent subsidy program.

Field Stations

Beltsville, according to Mr. Hambleton, is unfortunately located in poor beekeeping territory, for honey plants are not available in abundance. This has meant that much of the field work in queen breeding and honey production is left to the field stations. Field stations dealing with pollination, bee diseases, management practices, and bee breeding are located at the University of Wyoming, Laramie, Wyoming, at the University of Louisiana, Baton Rouge, Louisiana, at the University of Wisconsin, Madison, Wisconsin, at the Utah Agricultural College, Logan, Utah, and at the University of Arizona, Tuscon, Arizona. These stations work in close cooperation with state colleges and agricultural experiment stations.

The Work at Beltsville

Progress results from knowledge and important aspects of the Beltsville station are the library and maintenance of a reference file. The beekeeping library at Beltsville contains complete sets of many bee journals and the latest books in beekeeping. Many old bee books, dating from the 1700's and 1800's, also may be found on the shelves. Beekeeping journals, books, and bulletins, as well as other journals concerned with entomology and beekeeping, are reviewed and summarized each month. The data thus obtained are filed on cards, duplicated, and sent to the field stations.

Bee Disease Section

The bee disease section, under the direction of Mr. A. S. Michael, deals with the diagnosis of samples sent to the laboratory by beekeepers and state bee inspectors. Microscopic examinations are made to identify the organisms associated with the various bee diseases, and cultures of these organisms are made for further study when indicated. A correct diagnosis requires a well-trained bacteriologist, for, as in the case of European foulbrood, not one, but five different bacterial organisms appear to be involved.

One of the most important portions of the work is the constant vigilance and examination of bees for the presence of the mite (**Acarapis woodi** Rennie), which is common in many parts of the world, where it is responsible for great losses each year. The mite enters the bees' breathing tubes and blocks them, which usually results in the weakening, and often the death, of individual bees. This in turn results in colony decline. Due to the firm stand taken by Mr. Hambleton and the staff at Beltsville, we have not imported bees into the United States for a number of years, and this disease is not present in this country.

The present use of insecticides also has complicated the picture. To positively identify each insecticide, a special method of analysis is required. Research at Beltsville is underway to formulate a method of diagnosing for the presence of poisonous materials. Brine shrimp, which are very sensitive to a small quantity of insecticide, are thought to be a partial answer to the problem. Once it has been determined that a poisonous material is present, a more thorough search for the specific insecticide can be undertaken.

Biological Control Section

The biological control section searches for insects, bacteria, fungi, etc., which can be used to control harmful insects in the field. This is of special interest to beekeepers because the discovery of organisms which can be used to kill harmful pests means that fewer insecticides will be used for the same purpose.

Many biological control programs have met with much success. In most instances where a satisfactory parasite or predator has been found, the control becomes permanent, and repeated introductions of the control organisms become unnecessary, which means that the ultimate cost is much less.

All parasites and predators which are to be released are thoroughly tested to determine if they will attack animals or honeybees and other forms of life beneficial to man. Fortunately, most parasites and predators are hosts specific, which means they will attack only one group of plants or animals. If their source of food is not available, they perish. Biological control programs undoubtedly will expand in the future, and if this proves to be the case, there will be less danger from insecticides to honeybees.

Because the Bee Culture Laboratory works on a national level, and on long

(Continued on page 127)

PRODUCING

Package Bees

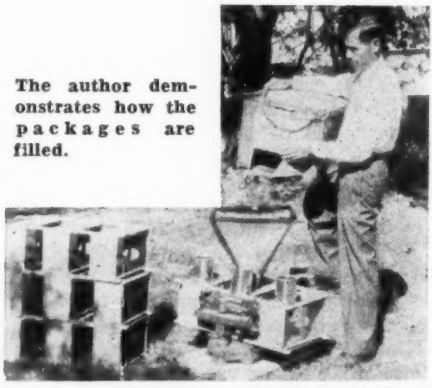
HOWARD WEAVER
Navasota, Texas

IN OPERATING bees for package production, the beekeeper must maintain strong, healthy colonies prior to, and during, the shaking season. The outyards must be located on roads which are always accessible by truck in any kind of weather.

Since the package season comes in the spring when we have only minor honey flows, the beekeeper is forced to leave his colonies extra heavy with honey in the fall. Even with this precaution, some hives will run short on stores. We have made a practice of storing honey in combs for outyard feeding. A few supers of this honey are carried in the truck during the spring season to feed colonies that are getting light in stores. Of course, extra robbing precautions must be maintained at all times when feeding with honey. We have found this is a fast and cheap way to feed at any time. To protect these combs of honey, as well as the nuclei honey, and extracting combs from the wax moths, we have a tight fumigating room for their storage.

As soon as one package season is over, our aim is to get the colonies in shape for the next season. With this purpose in mind, all colonies are requeened during the summer and fall months. Increase is made to replace normal operating losses. The queen-mating nuclei and feed honey are stored during these months. Of course, we are operating for extracted honey too. However, the bees are always weakened from shaking; therefore, we are not able to get the most out of our main honey flows.

In January after the first pollen appears, and queens have begun to lay, the colonies are examined. A little honey is uncapped to stimuate brood rearing. This operation is repeated every two weeks. At times we simply spray top bars of the brood nest with sugar syrup. At these frequent inspections other adjustments are made, namely, placing a super of honey under the hive body which contains the



The author demonstrates how the packages are filled.

brood, giving empty brood combs if the colony is honey bound, checking the brood pattern, and replacing any failing queens.

Grafting Cells

Grafting of queen cells begins by the first of March, and the stocking of the mating nuclei must be completed within the month. However, a sudden freeze is still possible at this time of year which can delay any planned schedule, and sometimes causes untold damage to queen cells and brood rearing. In drawing bees from the outyards for stocking mating nuclei, only a few bees are shaken from the strongest colonies at any one time. The aim is to bring the colonies to their maximum brood-rearing strength by the beginning of the package season.

Shaking Bees Into Shipping Cages

In caging package bees, we have used various methods. However, for many years we have been using the shaker box to cage our packages. This box strains out the drones and queens, yet it gives time for most of the old bees to fly out while the young bees run through the queen excluder and are trapped for the packages.

To operate this shaker, place the colony on top of the shaker, one hive body at a time, and jar the bees out by bouncing it three or four times on top of the shaker. If the operator prefers, he can shake only one comb at a time. This shaking process is repeated until the shaker box is filled with bees. They are then emptied into the packages, weighing each as it is filled. Liberal overweight is given to assure full measure at time of delivery. As the packages are filled with bees, the waiting caged queens and syrup cans are dropped into place as the package is closed.

When the packages are brought into the honey house they are given one or two liberal feedings of sugar syrup. Proper addresses and shipping instructions are secured to each crate. The loose bees that always collect on the outside of the packages are easier to brush off after dark. When the packages are loaded to be trucked to the express and post office, the loose bees are brushed into a vat of water, and later dumped at the entrance of some colony.

There are many details which can not be included in this short article, but through experience one learns their importance.

The main objective of every package producer is to satisfy his customers season after season. We package bee producers must be careful not to accept more orders than we can properly fill on the customers' preferred shipping dates. The package buyer can be of inestimable help by placing his orders early. The fall of the year is not too early to let your favorite queen and package producer know your needs for the coming year.

VERMONT BEEKEEPER

Newell Wilson of Newport, Vermont, is a beekeeper who secures good crops when surplus honey is available. He operates a farm as well as his bees.

MAINE HAS a varied topography and climate. About one-fourth of the land is in farms. The rest of the State is in forests. Northwestern Maine is a heavily wooded tableland with many lakes and mountain peaks of over 3,000 feet elevation.

Central Maine is a rolling upland rising in places to 500 feet about 70 miles from the coast. Here occur numerous lakes, several large rivers, and many small streams. The Coastal Area is narrow and relatively low in the southwest but becomes wider and more rugged toward the east.

Bees can be kept with profit in all the farming areas. Yields of honey vary from 20 to over 100 pounds. The State has about 8,000 colonies. Only a few beekeepers have over 50 colonies. More bees are in villages and small towns than on the large farms.

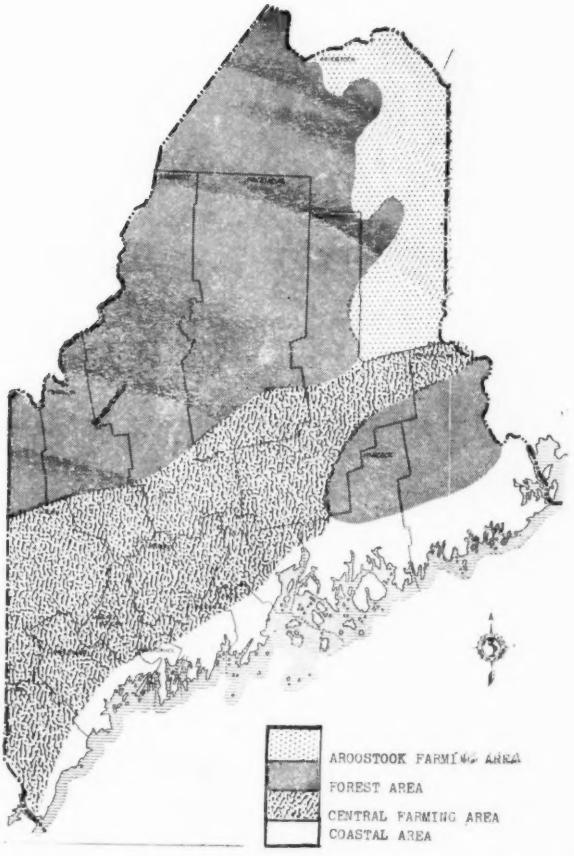
The Central Farming Area is important as a dairy and livestock region. Apples, potatoes, sweet corn, beans, and peas are also grown. Forests make up over half the area. Bees are especially profitable wherever white and alsike clovers are used in livestock production.

Willows, maples, dandelions, followed by wild cherry and apple provide early sources of nectar and pollen. The main honey flow starts about June 15 and lasts until July 20. Alsike clover, white clover, raspberry, and basswood are the chief sources. Cool and rainy weather often retards nectar secretion and prevents bee flight. Heavy nectar flows are characterized by temperatures in the 82°F - 95°F range. Such temperatures do not come frequently nor last long enough for large honey crops.

The fall flow comes in September from goldenrods and asters. It often gives the largest yield of the season. Quality is not equal to the clover flow but is good. With many pollen and minor nectar plants in both spring and fall and with a reliable fall honey flow, the overwintering of bees is not difficult in this part of the State.

The Aroostook Farming Area

This is one of the most extensive in New England. Soils are excellent for agriculture. Potatoes, oats, and peas for freezing and canning are widely grown. The clovers flourish and are used in livestock production which is expanding. The main honey flow is largely from alsike and white clover and extends from June 15 to the middle of August. The highest yields of honey in Maine are secured here. The yield from goldenrods and fall sources are not dependable. The higher elevation, 500 to 700 feet, and the distance from the ocean results in a short growing season of about 115 days. Frosts come in early September. The springs are late and nectar and pollen sources for bees are often unfavorable until late May.



The Coastal Area

This is not as important agriculturally as the Aroostook and Central sections. Truck crops, poultry, and blueberries are the chief crops. There is less land in farms than farther inland. Clovers are not so well adapted. A narrow strip about 12 miles wide running parallel to the coast is characterized by frequent fogs and cool winds from off the Atlantic. Bees are relatively less profitable here than elsewhere in the State. Fruit bloom, blueberries, raspberries, sumac, milkweed, willowherb, goldenrod, and asters are the chief honey plants in the coastal area.

Blueberry Areas

Blueberries are grown to some extent in every county of the State, however, the industry is concentrated especially in Washington County and in a narrow strip along the coast.

Wild lowbush blueberries come up after woodland fires and are found extensively from tide water to mountain peaks. Some very profitable blueberry fields are located far inland on the foothills of western Maine. At present Maine is growing about 22,000 acres of this crop and year by year the acreage is increasing. Higher quality and yield is coming about through research on improved cultural practices, one of which is pollination.

Honeybees are moved each spring from the central farming area to the blueberry fields. Demand has exceeded the supply of colonies available from Maine in recent years and bees from other parts of New England are also being rented for pollination.

The blueberry flowers open about the same time as apples but the blossoms remain open over a longer period of time. For the blueberry section of Washington County, the period of bloom extends from May 25 to June 20. Frequently the weather is cool and cloudy for several days each week during pollination. Under favorable weather the nectar flow is heavy and yields of 20 to 40 pounds of honey are sometimes obtained. The honey has a distinct flavor and is of excellent quality.

Making the Most of *Pollen* Substitutes and Supplements*

by W. W. CLARKE, JR.

What bees can do in the way of pollen collection is clearly illustrated in the cover picture

THE LACK of sufficient pollen in some areas is a serious handicap in wintering and in developing colonies from packages in time for the spring honey flow. No completely satisfactory substitute for pollen has been found although good results have been obtained by the use of soybean flour (expeller process) mixed with either powdered skim mlk or natural pollen. The soybean flour should have a low fat content.

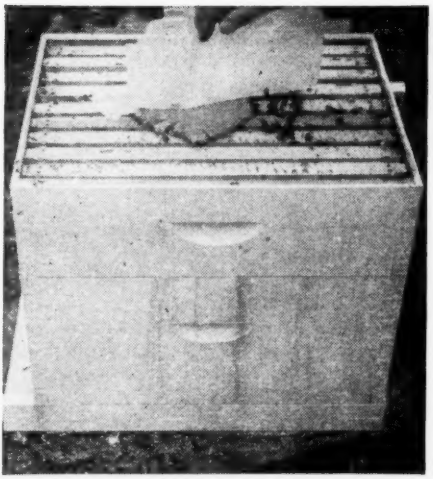
The pollen trap shown here consists of square meshed hardware cloth placed parallel and about one-half inch apart at the entrance to a bee hive. A pollen-laden bee can just make its way into the hive by making two sharp right-angle turns, in the course of which the pollen pellets it carries are brushed off and drop into a collecting box.—USDA photo by Forsythe.

W. J. Nolan, USDA apiculturist, shows how the pollen trap works. To get into the hive, a bee must walk through a wire mesh screen. This scrapes off the pollen pellets into the tray below. —USDA photo by Forsythe.

The following mixtures have been developed and fed with considerable success.

1. Soybean flour (expeller process)

* See Editorial page for more details.

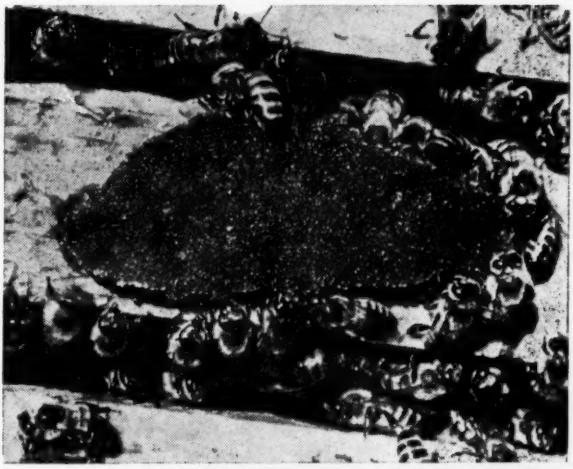


A cake of pollen substitute being placed on the top of a colony.—Photo by W. A. Stephen.

four parts (by weight) to one part of powdered skim milk. Place the mixture in a shelter in the apiary where the bees will have free access to it. The bees will collect it as needed and carry it into the hive. (Keep the mixture dry).

2. Moisten one part pollen (by weight) with a little water and stir until all the pollen pellets have dissolved. If the mixture is left overnight it will dissolve much more readily. Stir this mixture with two parts honey or sugar syrup (made from two parts sugar and one part water). To the syrup containing the pollen add three parts of the soybean flour and mix thoroughly. Pollen softens readily in water but not in syrup.

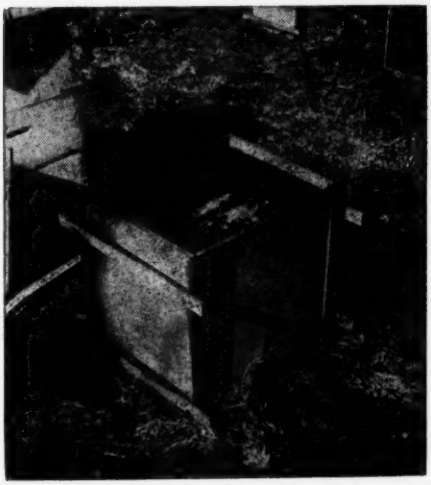
Mold into oval cakes one and one-half inch thick and eight inches in diameter. Waxed paper between the cakes makes them easier to handle and they do not dry out. Place the cake over the cluster or brood nest, under the inner cover which should be inverted to give more room. Additional cakes should be given as needed.



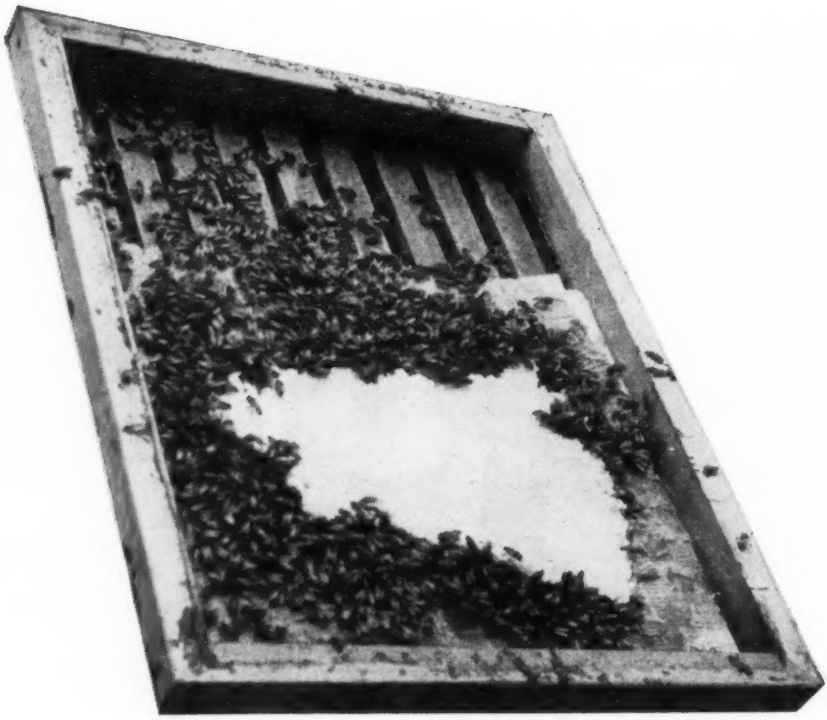
Bees feeding on a pollen substitute cake.—Photo by W. P. Nye.

To stimulate brood rearing of wintered colonies, the pollen supplement should be fed about the 15th or 20th of March.

To obtain the natural pollen it is necessary to trap it the previous year from a strong colony. A pollen trap is made in such a manner as to make bees entering the hive pass through a double gird of hardware cloth, five meshes to the inch; one-half inch apart. The pollen falls into a box covered with hardware cloth eight mesh to the inch. The trap must be covered to prevent rain getting into the pollen.



Most of this pollen cake has been consumed by the colony.—Photo by M. H. Haydak.



"What Turned Me Sweet On Dry Sugar"

ROBERT A. STAUBLE, Techny, Illinois

THE WINTER of 1954-'55 was rather mild here at Techny, Illinois. In our 150 colony home yard, that meant lots of activity and heavy consumption of stores. Toward the end of February I discovered that at least two-thirds of these colonies were dangerously low on food. And I mean dangerous—many had no more than ten pounds between themselves and starvation!

A number of years ago, Brother Frederick, wise old head apiarist here at Techny, designed a wooden rim and a new method of feeding dry sugar. As is the case with so many inventions, he sort of stumbled on it, driven by necessity. He had more syrup feeding to do than he could possibly find time for. Just why isn't dry sugar working more successfully, he asked himself. Perhaps if we would try feeding it from on top of the frames. . . . .

He covered most of the top of the frames with several thicknesses of newspaper and poured the dry sugar on top of the paper. Next, after having

removed the wire from an old queen excluder; he put it on top of the super so that the inner and outer cover would fit on top of the sugar. And when he came back to check it, it was working like a charm!

He hasn't made any essential changes in the process since then. We now use an inch and a quarter high rim, and with it are able to put as much as six to eight pounds of sugar on desperately starving colonies. Then you can rest assured that they will not need a refill before three or four weeks. This season we had colonies that consumed up to 30 pounds of dry sugar!

One photo shows yours truly balancing one of these shallow rims (16¼" x 20" x 1¼") over a colony being fed by this system. The lead photo shows the rim in place and the bees working the sugar.

A sufficient supply of clean water must be available to facilitate the bees' process of dissolving and storing the sugar. This watering trough solves the problem in our home yard, and the cypress wood grating in the bottom prevents many bees from chilling and drowning. On most any fine day before the honey flow, you can go out and see the trough just brown with drinking bees. We set the faucet at a very slow stream during the feeding season, and the drain at the opposite end of the trough assures fresh water at all times.

Note uniformity of colonies resulting from dry-sugar feeding.

The author is shown holding a rim for dry sugar.

Dry Sugar Feeding Saves Time and Labor

I believe the greatest advantage of dry sugar feeding is in time and labor saved. After a momentary look at the colony's needs, just the right amount of sugar can be doled out, and the feeding can be finished in a very short time. With me this was a strong sale's point, compared with the mess and bother involved in feeding sugar syrup.

Besides, dry sugar feeding does not affect the colony as a stimulative flow as does syrup. I have experienced especially regular and solid brood patterns in dry sugar fed colonies.

In cases where a colony has become extremely weak it may not be able to handle dry sugar. In such situations, confining them to several frames and feeding them syrup may be their only salvation.

Why this system of sugar feeding works and so many others, such as feeding from the hive floor, do not, is, I believe, due to draft and temperature conditions. The bees can keep the

(Continued on page 126)

Renting Bees for red clover pollination

RAY T. EVERLY
Indiana Agric. Exp. Sta.

At last a sample pollination contract for red clover pollination. Can be adapted to fit needs of other crops too.

The renting of colonies of honeybees to pollinate fields of red clover is a relatively new field of work for both beekeepers and clover seed producers. So in order to arrive at a working basis for beekeeper and seed-grower cooperation the following facts should be remembered.

1. Beekeeping profits are derived largely from the sale of honey.

2. The use of bees for pollination does not increase the amount of honey produced. Red clover bloom for a seed crop rarely provides enough nectar for bees to produce surplus honey and in many years bees so used must later be fed to maintain colony strength. The end result may be the production of less total honey for the season.

3. The moving of bees may weaken the colonies and make them more susceptible to disease.

4. Published cost analyses indicate that it costs from $4.00 to $5.00 to move a colony of honeybees for pollination services, these costs varying with the distance involved, etc.

With these costs and risks evaluations as a background, the Pollination Committee of the Indiana State Beekeepers make the following recommendations as a basis for seed-grower and beekeeper agreements:

1. That for supplying two strong colonies of honeybees per acre, the beekeeper shall receive in payment for his services:
   a. Twenty-five per cent of all red clover seed produced; or
   b. A payment of seven cents per pound for all red clover seed grown; or
   c. A rental payment of $6.50 per colony.

2. That a written agreement be made between the beekeeper and the seed grower specifying certain responsibilities for each party. A sample agreement in which the following points are specifically set forth is shown on the opposite page. Here are the points covered:
   a. method of payment
   b. provision for access to the field
   c. protection of bees against poison sprays

Colonies should be inspected for disease and strength before moving to red clover fields.—Photo by H. Fretz.

Agreement

for the Services of Honey Bees for Red Clover Pollination

I,....., a seed producer having.....acres of .....clover, on which I want to place.....colonies of honeybees for pollination purposes do hereby enter into this agreement with..... ....., a beekeeper, for the period....., 19....to..... 19....inclusive.

I agree that .....per cent of all seed over and above.....bushels per acre, or the equivalent monetary value, shall become the property of the owner of the above mentioned honeybees; or that I shall pay $.....per pound for all red clover seed produced; or in lieu of such payments, the sum of .....per colony, pursuant to the following specified responsibilities. I further agree that, I will provide adequate access to the field for the use of the beekeeper at any time while the bees are in the field; that I will assume all costs and risk of spraying or dusting, mowing, raking, and harvesting, and that these operations shall be in all respects identical with those recommended by the qualified authorities at Purdue University, in so far as such necessary equipment shall be in my possession on the date of this agreement; that I will serve notice in writing to the beekeeper 10 days in advance of the date such bees are to be placed in the field and then two weeks prior to date when such bees are to be removed, such removal to complete the obligations of the owner of the said bees under this contract; that I will complete payment for the use of these honeybees as specified above within.....days after field harvest is complete. As an acknowledgment of good faith, I further agree to pay to the owner of these honeybees at the time they are placed in the field the sum of.....dollars per colony, such entire sum to be deducted from the final payment when made.

I,....., a beekeeper, in recognition of and upon agreement as herein stated, agree that I will furnish a minimum of..... colonies of honeybees, such colonies to be of sufficient strength to average eight frames of brood with a strong queen, or to satisfy a qualified inspector that such colonies are adequate to satisfy the pollination demands.

I further agree that, I will move the above number of colonies into this field within 10 days of written notice, from the seed producer placing these colonies so that one-fourth are in each quarter of the field, or distribute them in groups of 10, equally distant about the field subject to the provision that this clover shall be in bloom at the time of moving; I will upon written notice from the seed producer, within two weeks after such notice, remove the above colonies from the field, such removal to terminate my responsibilities under this contract; I further agree that I will assume all costs and liabilities involved in moving the bees into the field and in their removal from the field.

We, the undersigned, further agree that failure to comply with any agreement herein stated does not relieve us of any other obligations under this contract, and that the injured party has the right to full legal redress for such failure.

....., Indiana.....
Seed Producer

.....day of..... 19.... .....
Beekeeper

d. time when the bees are to be moved
e. assurance that bees provided will satisfy pollination demands
f. distribution of colonies in the field
g. responsibility for moving costs and risks
h. assurance that seed will be harvested properly if payment is to be made in seed or its equivalent.

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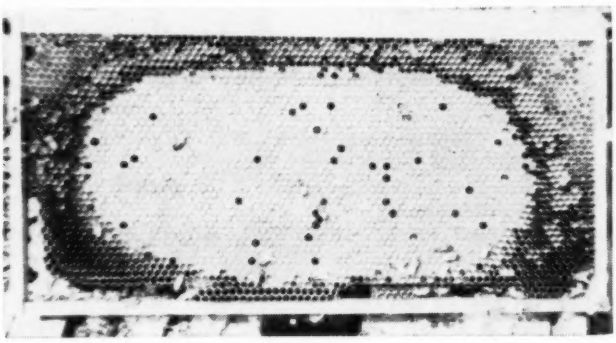
Pollen feeding make solid slabs of brood and strong colonies.



ARE YOU READY FOR SPRING?

Asks J. M. AMOS of the
Virginia Agric. Ext. Service

YOU CAN be ready for spring by completing many timely practices in the fall of the year.

Fall operations that are important in reducing spring work in the apiary are: Providing a good queen, an adequate food supply, and a satisfactory windbreak to protect the bees from cold winter winds and to permit their flight on warm but windy days. Of course weak colonies should be united with strong ones, and colonies should be located where the sun will shine on them during the warmest portion of the day.

If all the necessary work is done in the apiary in the fall, very little work needs to be done in the eastern and southern portions of the country until it is time to check the food supply in the spring. However, if the apiary is not enclosed in a skunk-tight fence, or has no protection against skunks, a hasty check of all colonies should be made at the hive entrances for their scratching and mud marks, especially if the weather has been warm for a week. Skunks working at hives can make them ill-tempered and slow down colony build-up. With the ground hard and frozen, bee hives close to the ground are easy prey and plenty of food for these pests. They seem to be very abundant in many localities. Steel traps are good to catch them so they can be destroyed.

Ample Honey and Pollen Essential

At the first examination colonies should be surveyed for both honey and pollen. In many sections where maples, alder, skunk cabbage, and other early pollen plants are lacking, the feeding of a pollen supplement or pollen substitute is valuable in bringing colonies up to full strength by the early honey flow from tulip poplar, crimson clover, and vetch.

I have tried most of the pollen substitutes, as well as Dr. Farrar's pollen supplement. None of the substitutes are taken quite as readily as the supplement, but, since one cannot get pollen in the spring to make the supplement it is best to purchase the ready prepared substitute of brewer's yeast and soybean flour (1:3). It may be fed dry in protected places in the apiary or in feeding stations as suggested by Dunham of Ohio. In the colder sections of the country, and possibly the earliest

feedings in the warm regions, the mixture of yeast and soybean flour can be made into cakes and placed between the food chamber and the hive body. It will take about two parts of syrup or honey to one of substitute for making cakes. The edge of the cake should be in contact with the cluster of bees so that they can feed on it readily.

When additional pollen feed is given a colony, the beekeeper should be prepared to expect more rapid colony development and possibly early swarming if the weather is adverse to good bee activity. Pollen feeding also requires more food reserves, so be careful and not run out. In many areas of the South, pollen feeding may not be necessary, but where large areas of farming land occur colony development may be slower than is desirable for the maximum honey crop because of the lack of pollen.

For those who have not used pollen feeding I would suggest that it be done on a few colonies or in apiaries that seem to reach their peak of development too late for the best honey crop. Another good place to observe its merits is with a few packages of bees.

Package Bees Should Replace Winter Losses

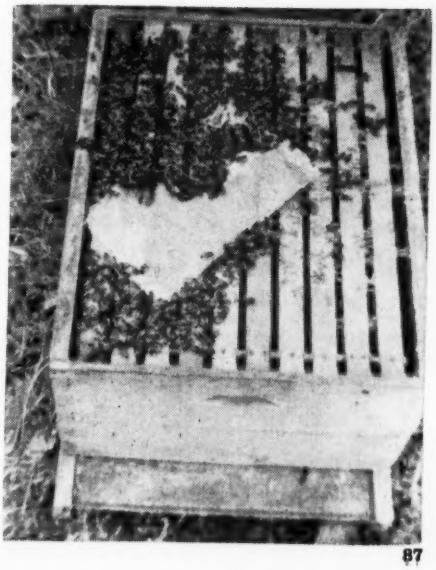
Package bees can be used to replace winter losses or to start new colonies, but should be started in March or early April where the honey flow comes in May or early June. Allow 8 to 12 weeks for the build-up of packaged bees. Feeding syrup and pollen substitute until all foundation or combs in the hive body are drawn and filled is a must, if the colony is to survive and produce well.

Queenless packages can also be used to boost the strength of units that are weakened by a long winter. To reduce possibilities of Nosema losses and queen supersedure, Fumidil B may be included in the feeding syrup for the first month. Follow the manufacturer's suggestions for feeding Fumidil B.

It is always necessary to watch the spring supply of honey in the hive. It has been shown that when the food supply in a colony is reduced to about 15 pounds there is a slackening in brood rearing in the colony. If this occurs early in the spring it may affect the quantity of honey produced from early blossoms.

Many commercial beekeepers prefer or like to see very little surplus honey in the colony at the beginning of the main honey flow. They feel it is a factor in colony morale and there is less swarming when this situation exists, providing the weather is right for collecting nectar. It is possible for strong colonies of bees to be lost from starvation in cool, cloudy, wet periods of April and May, so one should always be very careful about letting the food reserve in the colony get below 15 pounds. Even though it is present, 15 pounds of honey can disappear quickly when a large colony is full of brood and a few days of bad weather occur. A good feeding mixture for the spring is equal parts of sugar and water.

Sometimes in an emergency, dry granulated sugar can be given on the inner cover or on a newspaper over the frames with the inner cover inverted. If dry sugar is given too late to a starving colony it is likely to die, whereas syrup might save it. In either case the colony will not, or is not like-



A pollen substitute may be fed to boost colonies in February and March for an early honey flow in April and May.

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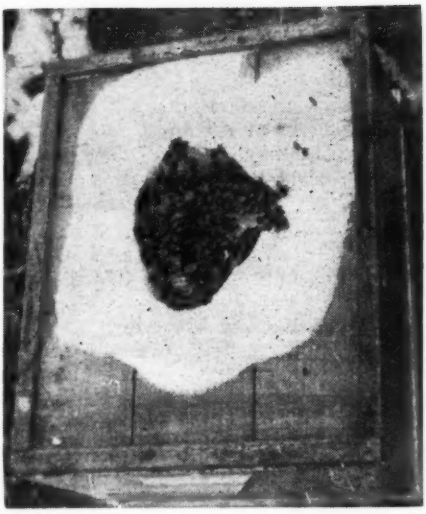
ly to be, productive unless the honey flow comes late in the season.

As a preventive against disease, sulfathiazole should always be included in syrup when fed to bees. It costs very little and is cheap insurance against AFB.

In the South during April and May, supering may be delayed too long for best colony morale. Sometimes maples will produce some surplus nectar and without super space it is crowded into the brood nest area and hastens early swarming. For extracted honey, where a single hive body or a story and a half is used for brood, a queen excluder is a valuable aid to the beekeeper



Dry sugar feeding on the inner cover.

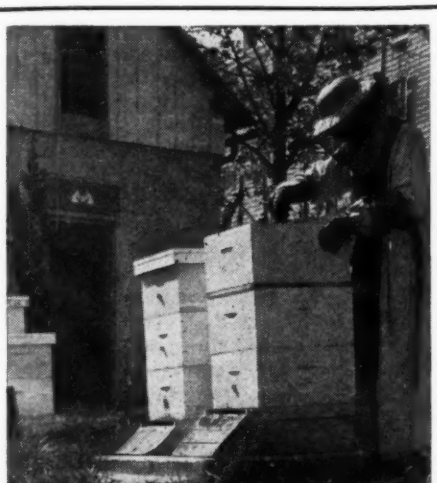
for keeping the queen below so she will not produce brood in the extracting combs of supers. An extracting super can be given above the excluder as soon as the weather and time permits. Plenty of room for the bees to spread out nectar when it comes in is a valuable asset to maintaining colony morale and reducing the desire to swarm. If the shallow side of the bottom board is not used, entrance blocks should be removed.

Where chunk honey is to be produced, supers containing foundation should be given at the beginning or just previous to the main honey flow.

When a second super is given it is usually given beneath the one that is partially filled. Do not add too much comb space, and from experience judge how many supers to add, and be sure not to give them too late in the honey flow. Give the bees a chance to fill up the space given them. Too much spreading may result in a breakdown of colony morale and subsequent loss of the honey crop.

A BEEKEEPING CLERGYMAN

Beekeeping fits well with almost every walk of life. Here a Trappist monk of the Cistercian Abbey, Trappist, Kentucky, examines one of the many colonies in their apiary.



production, the colony becomes weakened.

In 1942 Farrar pointed out that in experimental colonies with small populations "brood rearing decreased rapidly as the infection built up. . .". Weakening of the colony results because the infected workers are unable to care for the brood; the disease shortens the normal life span of the worker during this critical period. Furthermore, in 1951 Hassanein reported that

CONTROLLING NOSEMA

Nosema infected worker bees are less efficient than normal bees

DR. H. E. CMEJLA and DR. G. F. OTTO
Abbott Laboratories, North Chicago, Ills.

FUMIDIL B WAS first brought out on the market for the control of Nosema disease in package colonies because such colonies, when infected, suffer most severely from the infection. They suffer particularly because of the small population of bees initially and the necessity of developing their own brood, once the colony is established.

Farrar reported Nosema was present in up to 89 per cent of over 1900 package shipments from southern producers. Most of these infections were comparatively light but built up rapidly to heavy infections during the first three weeks after the colonies were established.

It is these first three weeks after a package is established that is the critical developmental period for the colony. This is the time when the majority of the bees concentrate their efforts on producing brood. Although there is no evidence that the brood itself is infected, it is brood production which suffers. As a result of this poor brood infected bees devote less time than normal bees to nursing brood. In general, **infected bees are less efficient workers than are normal bees.**

When the queen is infected, the resulting supersedure further delays brood production. Jamieson writes that in the period before there is a rapid emergence of young bees ". . . . queens in package colonies are most liable to become infected". In 1942, Farrar reported as high as 18 percent supersedure of queens, most of which was due to Nosema disease. Barnes estimated that in 1946 in Wyoming over half of queen losses in package bees that year were due to Nosema. More recently, Farrar reported in a 1947 issue of the Journal of Economic Entomology that infection with Nosema is one of the major contributing factors in abnormal queen supersedure. There is no evidence that this situation is any less a problem today.

Nosema disease, or any other condition which causes reduced brood

Brood rearing decreases rapidly as the Nosema infection builds up

production, resulting in weak colonies will cut honey production. In 1947 Farrar found that in heavily infected colonies honey production was off as much as 28 to 111 pounds. Apparently this does not include the losses from less heavily infected colonies on the one hand nor those resulting from the death of colonies on the other hand. Furthermore, it does not include such items as the actual cost of replacing the queen.

In the last issue of this journal it was pointed out that each operator, regardless of which management system he prefers, needs to streamline his operations to get the most out of his colonies. It is self-evident that in order to meet the growing competition in the honey market, the large scale operator must protect himself from losses. This is equally true with the bee hobbyist and others who operate on a more limited scale. For such beekeepers, the loss of a few colonies may essentially eliminate their entire production. Certainly the package buyer cannot afford to tolerate weak package colonies, suffer queen losses, nor any other delay in the build-up of his colonies.

Scientific laboratory experiments, verified in carefully c h e c k e d field studies under practical apiary conditions, emphasize that Fumidil B is an important supplement to management. This does not mean that Fumidil B is a do-it-all tool for the beekeeping industry. It should be considered an important part of good management.

With an increasing use of Fumidil B have come more frequent reports of increases in honey production. According to Farrar (1954), cooperating commercial beekeepers reported that colonies treated with Fumidil B produced about 30 pounds more, on the average, than untreated colonies. Several cooperators estimated 25 to 30 per cent greater production. In March of last year Jamieson stated "that significantly increased production was obtained in package colonies fed fumagillin at Ottawa in 1951 and at Brandon, Manitoba, in 1953".

As this is being written, even before all of the extracting has been completed, several reports have already come to us from practical beekeepers. These reports all show increased honey production following the use of Fumidil B during the 1955 season.

One such report, from the Hubbard Apiaries in Michigan, states that so far about 15 pounds more honey have been extracted from each Fumidil B-treated package colony than from the untreated colonies. Another large midwestern honey producer, Lakeshore Honey Farms, Inc., set up a controlled study involving 600 of their colonies. They used a slightly different pattern than the usual procedure with package colonies. Nuc boxes were established in the south and Fumidil B was fed to one-half of these small colonies during the period of preliminary build-up. Thereafter, they were established in northern yards, without further treatment, in previously used equipment. Each yard received 40 treated and 40 untreated colonies. They have reported that the treated colonies produced one more super per colony than the untreated; this would mean from 25 to 40 additional pounds of honey per colony.

It is particularly important to use Fumidil B in the treatment of package colonies when the bees are obtained from untreated package-producing colonies and untreated queen nucs. Even when the packages are taken from treated colonies, significant additional protection can be obtained by feeding Fumidil B as soon as these package colonies are established.

Experience so far indicates that Fumidil B should be provided for the package colony in a continuous supply for a period of not less than two to three weeks or until there is rapid emergence of young bees. For these package colonies, a gallon of syrup medicated with Fumidil B, provided as soon as the colony is established, will usually supply sufficient Fumagillin for this purpose.

Cover Picture

This USDA photo by Knell shows a pile of pollen that represents visitation to millions of flowers covering a range of hundreds of acres by the bees. Readers are urged to read the excellent article by W. W. Clarke on pages 80 and 81, also the editorial by M. J. Deyell.

The author, V. G. Milum (left), admires some fine comb honey as Eugene Killion, Paris, Illinois, looks on.

Honey Granulation And Its Control

VERN G. MILUM, University of Illinois

ALTHOUGH THE preceding article of this series gave some indication as to the control of honey granulation, perhaps in this specific article an examination of the basic causes of honey granulation should first be considered.

The primary tendency of a honey to granulate is dependent upon the concentration of its sugars in relation to its water content and the relative proportion of levulose and dextrose (L/D ratio). In general, honeys relatively high in dextrose as compared to the levulose which is higher, other conditions being equal, will granulate more quickly, and vice versa, although there are some exceptions to this rule.

Dandelion honey (levulose - 37.59, dextrose - 39.98) granulates very readily, even in the combs while tupelo honey (levulose - 48.61, dextrose - 24.73) may not granulate over a period of several years. Other examples of slow-granulating honeys, although not as pronounced, are bluevine, Spanish needle, and sage. Examples of fairly quick granulating honeys are alfalfa and sweet clover, where the

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proportions of levulose and dextrose are not as pronounced, the dextrose being less than the levulose but the L/D ratio is slightly more than 1.0 (i.e. dividing the percentage of levulose by that of dextrose). The sweet clover sample D w h i c h granulated readily had a levulose content of 40.15 per cent and dextrose of 37.52 per cent, a difference of 2.62 per cent greater levulose and an L/D ratio of 1.07.

With some exceptions, as this L/D ratio increases in value, i.e. as the levulose increases and/or the dextrose decreases, the tendency to granulate decreases. Actually then, honeys granulate because they are super saturated with dextrose with respect to the water content. While it has been suggested that granulation might be controlled by increasing the water content this procedure would seem to be neither practical nor legal. A statement on the container label indicating the addition of water would probably have a poor psychological effect upon the honey customers.

It is a well-known chemical and physical fact that with many supersaturated solutions, sometimes something else must be done to bring about granulation or crystallization. In some solutions, agitation or jarring will start crystallization; in others, a crystal of the material has to be added before crystallization will start. Thus with honey, if a quantity is made crystal-free by heating and then stored in sealed containers to prevent contamination with dextrose crystals, granulation will not occur over long periods, even if stored at temperatures favorable to granulation. This is partly proved by the tendency of honey in n e w combs, such as section comb honey (uncontaminated with crystals of old honey), to remain liquid for longer periods than extracted honey.

A possible source of contamination of liquid or extracted honey with dextrose crystals is the previously used extracting combs containing granulated honey. This source of contamination can be partially eliminated by returning supers after extracting in the fall to the colonies for cleaning of all the remaining honey, or by putting them on the colonies in the spring in sufficient time for cleaning before the main honey flow. The mixing of combs of granulated honeys from the food chamber with those of extracting supers is also a source of dextrose crystals for seeding the new crop of extracted honey.

Dextrose crystals, like yeasts, actually float in the air, particularly in the honey house. Contamination by both of them can be prevented partially by using covered storage containers. When honey is heated sufficiently to melt all the crystals, strained, and placed in containers, the lids of the wholesale or retail packages should be put on while the honey is still hot. Reopening the containers at a later time actually may cause seeding of the liquid honey with dextrose crystals, giving nuclei for centers of granulation, and may introduce y e a s t s for fermentation after granulation occurs.

There are other sources of crystals and yeasts in the honey house in addition to the combs and the air. All utensils, storage tanks, and the connecting pipes are likely to be sources. Only a few dextrose crystals from the extracting of the previous season will serve to contaminate the new crop, particularly the small portions left in joints, cracks, seams, or depressions. Therefore, all equipment should be cleaned, thoroughly before the new crop is extracted and processed.

If a given honey is likely to granulate or has been exposed to dextrose crystals, the next factor to be considered is the relation of storage temperatures to granulation. According to Dyce,[1] the temperature most favorable for granulation is between 50° and 65°F., with 55° to 57° suggested as the temperatures favorable for most honeys. Above and below these temperatures there is less and less granulation for most honeys, extending to none whatever.[2] There is only slight granulation at 75° with most honeys, and practically none at temperatures above 80°. At continued freezing or lower temperatures, granulation of honey is partially or completely eliminated because of the high viscosity which prevents the forming of aggregates or large crystals visible to the eye, even though minute crystals may be present.

[1] Dyce, E. J. 2931. Fermentation and crystallization of honey. Cornell Univ. Agr. Exp. Sta. Bull. 528:3-76.
[2] Milum, V. G. 1939. Granulation and its prevention. Amer. Bee Jour. 79:348-351.

Chemical Composition of Honey Samples

No.	Polarization	Water	Invert sugar	Levulose	Dextrose	Sucrose	Dextrin	Ash	Acidity	Undetermined
D	-17.0	15.90	77.88	40.15	37.53	3.01	0.33	.07	.15	2.66
C	-18.2	16.16	76.98	39.15	37.83	1.96	0.04	.05	.17	4.64
B	-14.6	16.63	75.40	40.67	34.73	2.26	0.42	.09	.11	5.09
A	-15.1	17.60	73.58	43.43	30.15	1.13	0.88	.08	.01	6.72

Besides the crystals in honey, other things which are said to influence crystallization are colloidal particles normal to all honeys, solid particles as pollen grains, and minute air bubbles. However, the effect of colloids and pollen grains is probably not of great significance because, if sufficient heating is used to melt the dextrose crystals, granulation can be prevented for long periods. It is entirely possible that in the introduction of the air bubbles, there is also a seeding of dextrose crystals from the air. If honey is placed under a vacuum to remove the air, granulation is delayed for a longer time, but the flavor may be reduced.

One remaining factor that may effect honey granulation is the type of strainer used if the honey has not been heated sufficiently to melt all the crystals formed. With the honeys shown in Table 1 above, those samples heated only to 130 and 145°F. for 30 minutes which granulated in various amounts during the first year. The amount of granulation in general was proportional to the size of the filter pore in the strainer. Using silk bolting cloth of the size corresponding to the requirements for U. S. Fancy Grade of extracted honey (86 mesh to the inch), sugar sack toweling of 48 mesh to the inch and milk strainer cloth of 46 to the inch, it was found that the amount of granulation was greatest in the reverse of the order named. In other words, the milk strainer although it permitted only a slow passage of the honey was more efficient in straining out the unmelted dextrose crystals because of its nap which formed a finer network of strands of cotton, while the silk bolting cloth with 86 mesh to the inch consisting of single individual threads of silk with no nap allowed the passage of the crystals because of the comparatively larger filter pores. The efficiency of the ordinary sugar sack toweling was between these two extremes and since, so far as cleanliness is concerned, it meets the requirement for U. S. Fancy Grade of extracted honey is therefore recommended.

Formerly such cloth could be purchased at department stores but with the packaging of sugar in paper, it is becoming increasingly difficult to locate a source of supply. Some states require that extracted honey, in order to meet certain requirements, be as clean as if strained through cloth of the milk strainer or outing-flannel type as in the state of Oregon where Grade A requirements are that the honey be as clean as if strained through standard bolting cloth of 86 mesh per inch at a temperature of not more than 130°F., or "Daisy Cloth," or a 40 to 50 mesh per inch outing flannel at a temperature of not more than 150°F.

Thus we may summarize, that so far as elimination of honey granulation is concerned all honeys should be so handled as to prevent contamination with dextrose crystals both in the combs and after early extraction as soon as the honey is well ripened. Extracted honey should be strained first while cool, then heated in a water bath with some agitation or by any method which insures uniform and rapid heating to 160°F. (lower for honeys high in levulose) for 30 minutes, then strained through sugar-sack toweling or material of similar porosity, placed in containers while hot and sealed with air-tight closures or lids. All air bubbles and foam formation caused in these processes should be eliminated by proper apparatus. After placing in containers, processed honey should be cooled promptly and placed in storage in a dry atmosphere with a uniform temperature at any convenient and economical point below 70°F.

XUM

The Start of Beekeeping Extension Work

As told by
GEORGE REA, Reynoldsville, Pa.

Part II

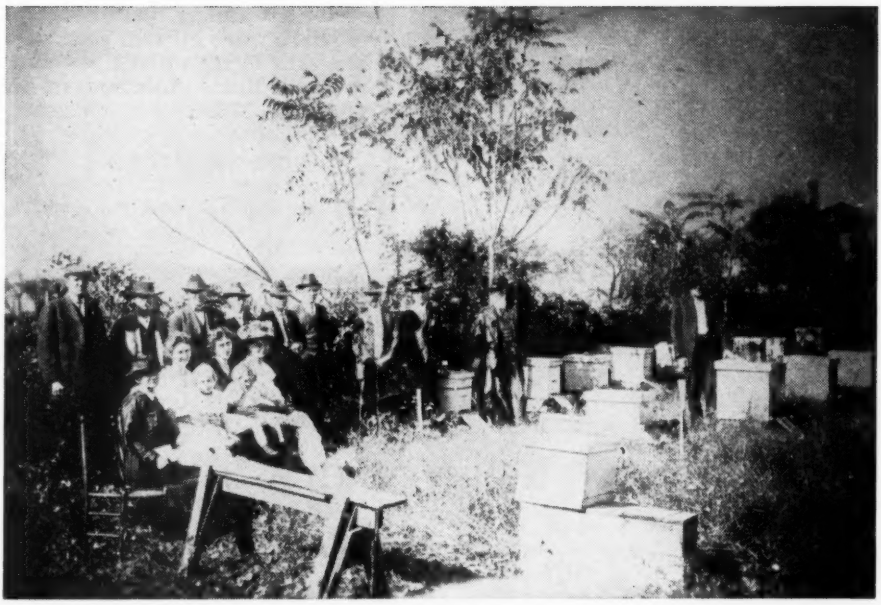
PLANNING THE new beekeeping field program and writing to county agents and leading beekeepers occupied several days in the Raleigh office with Entomologist Sherman. We decided that it would be best to confer personally with those we thought would be most interested. This required many days of driving and some trips by train but resulted in becoming acquainted with these men and planning many apiary visits and demonstration meetings. The first field trips centered in counties where the greatest interest had been shown in response to Carr's survey and letters sent out by Sherman. These were well distributed over the three principal agricultural divisions of the state and offered a fine opportunity for practical work with the bees through a greater part of the entire year.

The first beekeepers' meeting resulting from our planning was on October 2, 1916, in the apiary of L. E. Webb at Morganton, North Carolina. A picture of this meeting shows ten men, four women, and two little girls out in the Webb apiary. Among these were County Agent E. L. Perkins; R. B. Moore, Superintendent of the State Hospital Farm at Morganton; State Entomologist Franklin Sherman; Mr. Webb; and myself. The others are not identified. Some colonies were opened and modern beekeeping methods for better management were discussed.

The Webb bees were all in modern hives and well kept. There were many such modern apiaries in North Carolina, especially in the Piedmont and Coastal Plain, but they stood out in contrast to thousands of apiaries in unprofitable condition, in box hives and log gums, without movable frames. These uncared-for bees were a prolific source for breeding the southern beekeepers' two chief enemies, the bee moth (the larva of which destroys the combs and is known generally as "worms"), and a bee larva disease known as American foulbrood.

The second meeting was held on the Reynolds Estate near Winston, with County Agent Bruce Anderson in charge. Anderson was a real beekeeping enthusiast and kept bees of his own. This meeting was attended by a considerable number of beekeepers, and the chief interest was in organizing a state-wide beekeepers' association.

On request from county agents and beekeepers, several trips for group meetings and apiary visits were made into various parts of the state as far west as White Rock and Asheville and eastward to New Bern, Washington, Wilmington, Roper, and other places. Some trips were made by myself and mostly in the little Ford car which proved entirely reliable on most of the main roads. It carried me to places without much delay, whereas if I had taken a train to main points I would



Demonstration meeting, Apiary of L. E. Webb, Morganton, N. C., October 2, 1916. Standing, left to right: 1st L. E. Webb, 2nd unidentified, 3rd Franklin Sherman, 4th George H. Rea, 5th R. B. Moore, Supt. State Hospital Farm, 6th County Agent, E. L. Perkins.

have been many miles away from where I was to go and with many delays. Some counties did not have county agents at that time.

My reports reaching Washington, D. C., every few days aroused the enthusiasm of E. F. Phillips, and by long distance telephone he suggested that when I found a "good stopping place" I should go to Washington to give him a first hand accounting of all that was going on. He suggested further that I might want to stay on that job permanently and would want to extend the trip to Pennsylvania and take my family to Raleigh. I told him that there was no such thing as a "stopping place" with the North Carolina beekeepers, but I thought his suggestion a good one and as soon as the present field schedule for the next few days was completed I would go to Washington.

A period of clear weather had dried the mud except in very low places and had given road workers a chance to put the roads into much better condition than when the trip to Raleigh was taken. The first day's drive carried me to Richmond and the second day easily to Washington, although there were many very rough places and some wet spots that slowed the car down. I note here that the old road from Richmond to Fredericksburg was by Spotsylvania and probably followed what are now routes 54, 671, 738, and 208.

A Conference with Dr. Phillips

Phillips used to like to say, "Let us chew the fat until the fat is all chewed out and only the real meat is left." That is exactly what we did until the wee hours of morning. He thought that my "juvenile" enthusiasm for a state-wide meeting was premature and that if I insisted on calling such a meeting for sometime in January, as some prominent beekeepers had requested, it would result in failure such as had been the case recently in another state. He had gone to that meeting as the principal speaker and was so disappointed that he would not attend another without assurance that at least 50 had promised to be there. Quick to assure him that we could call together at least double that number with the organization of a state association the objective, he said that he would be there just because I had said so.

I was in high spirits while I drove to

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Reynoldsville and loaded up the family for the long trip to Raleigh. Regardless of rough roads it was mostly a lot of fun in dry sunny weather. An invitation on the part of one of my former deputy bee inspectors caused us to go to Bedford, Pennsylvania, for the first night and Washington, D. C., the second night to be with family relatives. We left there after lunch hour and spent a third night in Spotsylvania, Virginia. It was an old-fashioned brick house and the lady was proud of a hole all the way through it made by a Yankee cannon ball during the "Uncivil" War.

The third day's drive, from an early start until 1:30 a.m. the next night (or morning) was tiring but we were glad to get into a very comfortable home we had rented in Raleigh. I knew the road and wou'd have arrived earlier had it not been for a blown-out tire that occurred between Oxford and Durham. The children, six of them, were restless, and all of us were very tired. The night was overcast and pitch black. The road was wide enough to pull off to one side although there was little danger, for automobiles were few and far between, especially at about midnight. Groping about I found a piece of an old log and some sticks and soon had a fire going some 20 feet from the car under a tree. Blankets were spread out and the children slept while the spare tire was exchanged for the damaged one, with the aid of the bright light of the fire.

A Notable Bee Meeting

A circular letter was mailed from the office of State Entomologist Franklin Sherman in Raleigh where I also was quartered, to all county agents and many prominent beekeepers, calling for a state-wide beekeepers' meeting to be held on January 11, 1917, in the City Hall, Winston, North Carolina. Dr. E. F. Phillips of Washington and Mr. E. R. Root of Medina, Ohio, were invited to be the main speakers. The response was even greater than we expected. More than 150 were there from various parts of the state, and 131 signed their names for membership. Election results were: Franklin Sherman, President; Charles L. Sams, Vice-President; S. S. Statler, Secretary-Treasurer.

The North Carolina State Beekeepers' Association was off to a good start with able men in the official positions. County Agent Bruce Anderson, in his usual efficient and cheerful manner, greeted every one as they came and saw to it that everyone got acquainted with the others and made to feel at home. Both Phillips and Root spoke encouragingly about the possibilities ahead for building a prosperous commercial beekeeping business in North Carolina by improved beekeeping practices and organized efforts. This Association has continued for over 35 years to be the backbone of progressive beekeeping in North Carolina.

An early applicant for beekeeping service in North Carolina was County Agricultural Agent J. R. Sams of Madison County. Because of the unimproved roads and the difficulty of reaching many of the places he wanted us to visit in that mountainous county, he advised that I go by train rather than to even try to drive a car up there. To one who had read stories about the mountaineers it was thrilling even to think about seeing that rugged Great Smoky country, and here I was invited to make a survey of beekeeping up there. What was more important, to visit in the homes of the mountaineers and stay overnight with them sometimes.

To reach there by train required parts of two days. The first lap of the journey was from Raleigh to Greensboro, to stay overnight, and the next day to Asheville and Marshall that afternoon, where Mr. Sams met the train. Sams, with short gray beard, tall and straight, square-shouldered and muscular even in his advanced years, dressed in black and wearing a broad hat, was an impressive figure. My first impression of this quiet-spoken man of the mountains as he welcomed me warmly and at the same time seemed to look into my innermost being with his steady gray-blue eyes, was one of deep respect and admiration. I thought I saw in him a friend to be relied upon if I did my part and proved myself to his satisfaction. In this I was not mistaken, for before I left after a few days on that first trip I found that all and more than I had heard about him

(Continued on page 125)

1955 winners in the 4-H beekeeping project. L. to r.: John D. Haynie, Extension Apiculturist; Woodrow W. Brown. state boys' club agent; Elliott Owens, Micanopy, 3rd place; Broward Brogdon, Wewahitchka, 2nd place; Joseph Brady, Winter Park, 1st place; and William P. Hunter, field entomologist, Kilgore Seed Company.

Florida's Champion 4-H Club Beekeeper

J. FRANCIS COOPER, Editor Agr. Extension Service, Gainesville, Fla.

JOSEPH BRADY of Winter Park is Florida's 1955 champion 4-H club beekeeper. He and Broward Brogdon, Wewahitchka, and Elliott Owens, Micanopy, recently were awarded $25, $15, and $10 worth of beekeeping equipment or supplies by the Kilgore Seed Company of Plant City.

John D. Haynie, apiculturist, and Woodrow W. Brown, boys' club agent with the Florida Agricultural Extension Service selected the winners from among a dozen competitors from six counties. They considered each member's records in producing honey, increasing bees and carrying our improved practices.

Brady is a budding young beekeeper with 85 hives of his own. He produces primarily orange honey, since he is in the Florida citrus belt. His father, Arthur Brady, is a well-known Winter Park beekeeper and director of the Florida Honey Cooperative at Umatilla.

Brogdon has 49 hives and produces tupelo honey, as well as using his bees to pollinate clover in his father's pastures and thus produce clover honey. He started three years ago with one colony.

Owens has only four hives and makes most of his honey by pasturing his bees in annual sweet clover pastures of nearby cattlemen.

Their prizes were presented by William P. Hunter, field entomologist for Kilgore, who works out of Gainesville. In the accompanying picture Hunter is shown (right) presenting prizes to (right to left) Brady, Brogdon, and Owens, as Haynie (left) and Brown (second from left) approve.

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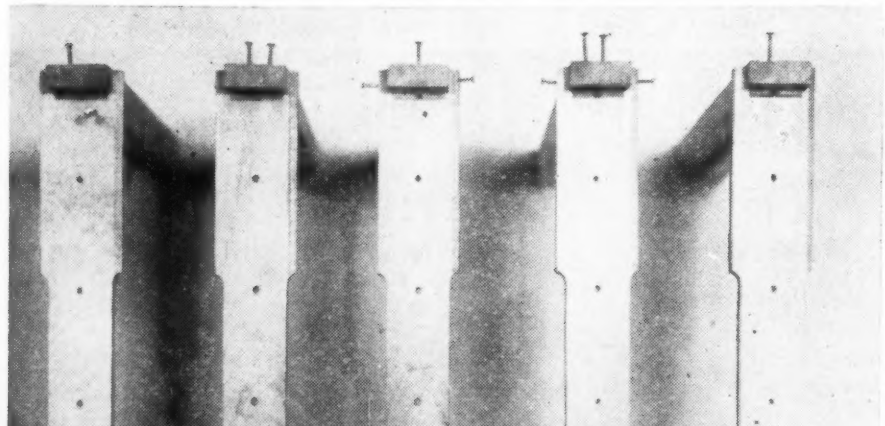
Figure 1.—Joint assemblies explained in text. No. 4 was the best nailed joint, and No. 5 using one nail and waterproof glue was the best joint.



How to Reduce BREAKAGE in Beehive Frames

S. TABER, III, Entomology Research Branch, Agr. Res. Serv., U.S.D.A., Baton Rouge, La.[1]

THE HIGH first cost of frames, the labor involved in proper assembly, and the cost of replacing drawn combs that must be discarded because of frame failure are important items of expense to the beekeeper. Increasing labor and equipment costs focus more attention on making beekeeping equipment last longer and on keeping it in the best condition. As most frame failures occur at the joint between the end and top bars, simple breakage tests were run to determine how to assemble frames to obtain the strongest union at this joint. No tests were attempted on breakage at other joints, such as end and bottom bar, or on the complete frame.

The end and top bars of standard frames were united in various ways. They were then held in a jig so that the frames were supported by the top bar exactly as if they were in a hive body, and increasing weight was ap-

[1] In cooperation with Louisiana State University.

Method of Assembly	Breaking Weight (Pounds)
Manufacturer's nailing recommendations (1 and 2)	78
Two 1¼-inch nails in top bar (2)	88
Four ¾-inch staples, two each in top and side, power-driven machine (not illustrated)	89
Three nails—one 1¼-inch in top bar, two ¾-inch in end bar on opposite sides (3)	106
Four nails—two 1¼-inch in top bar, two ¾-inch in end bar on opposite sides (4)	137
Water-resistant glue only, no nails (not illustrated)	198
Water-resistant glue with one 1¼-inch nail in top bar (5)	235

plied to the lower end of the end bar until failure of the joint between the two bars was noted. Frame breakage was defined by Alva Lowman of the Department of Engineering, Louisiana State University,[2] as ".... visible joint separation, not necessarily unusable."

Frames from three manufacturers of bee equipment were tested. There was little difference between frames from the various sources when the same method of assembly was used. However, the weakest joints were obtained when the manufacturer's nailing instructions were followed.

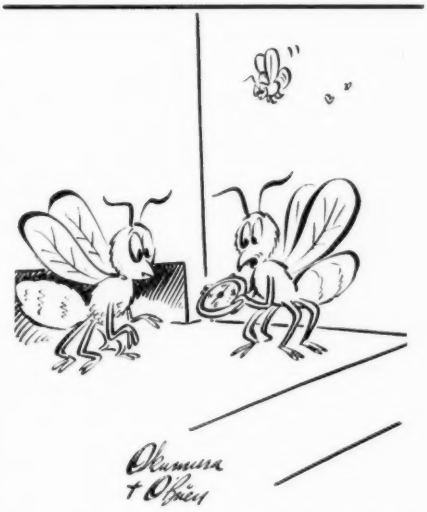
More than 160 frame joints were tested. The average breaking weights of at least 15 samples, five from each manufacturer, in each method of assembly (Fig. 1) are given below. Glued joints were allowed to set several days longer than the glue manufacturer's recommendation before the tests were made.

Note that a glued joint without nails is stronger than the best nailed joint (four nails in the top and end bars). The use of the one nail in a glued joint acts as a clamp while the glue sets. After the glue has set, the nail can be removed without materially reducing the strength of the joint. Tests were also made with other glued joints, using three types of glue, but no real differences were shown between them.

Joint breakage occurred in several ways. Rarely was there splitting of the top bar due to cross-grained wood. Generally the first indication of failure was a sagging of the end bar due to bending or pulling of nails driven into the end grain of both bars. Occasionally fracture of the wood was the first indication of joint failure. The reasons for breakage, in order of importance are (1) insufficient or improper placement of nails; (2) soft, low-strength woods; and (3) poor or improperly fitted joints due to poor manufacture or assembly procedure.

When one nail was used in the top bar and water-resistant glue on all joints, the time required for frame assembly was increased about 50 per cent over the usual method, in which one nail is placed in the top bar and two nails in the end bars. A large number of new synthetic-resin glues are now available. A waterproof or water-resistant glue is suggested because of the moisture-laden atmosphere of the beehive during the winter. No data are now available on how long a glued joint will maintain its strength under beehive conditions.

It is suggested that beekeepers try either the glued joint with one nail or the assembly using four nails, since these methods produce the strongest frames.



"I don't know how to dance so we'll use this compass to locate that field of flowers."

[2] Personal communication.

Editorials

Queens and Package Bees Essential to Our Industry

BEEKEEPERS IN the North who need queen bees early in the season for queenless colonies, may not realize, as they should, what is involved in the production of queens in the South, on a commercial scale. It is a comparatively simple matter to have bees in a queenless nucleus with young larvae, rear a queen later on in the season during a honey flow. However, to establish a queen rearing yard at the proper time early in the season and to have a continuous output of queens each day to supply the demand, does involve considerable skill in queen rearing which is not learned in a short period of time.

Imagine, if you can, the plight in which package queen and bee shippers found themselves on March 27, 1955, when unusually cold weather hit practically all parts of the South as well as the North. In many instances, queen breeders had young laying queens in queen-mating nuclei ready to send out. Many breeders had cells introduced to queen-mating nuclei. The weather was so severe that practically all of the brood and some of the bees in the mating nuclei were destroyed. This catastrophe set queen breeders back about three weeks in their shipping schedule. It is well to keep in mind that there is no section of the U. S., other than the southern tier of states, where laying queens can be purchased early in the season.

In reviewing the beginning and growth of the package bee business in this country, we find that the late A. I. Root was one of the pioneers, having started shipping bees in packages in 1878. Bees were then shipped via express in one-half, one, and one-and-one-half pound packages. The cages used then were similar to those used now. Specially prepared candy, instead of sugar syrup was used for food in the shipping cages.

In the early days of shipping bees many difficulties were experienced. During the past 30 years, the business has grown by leaps and bounds until at the present time, almost one million pounds of bees and a like number of queens are shipped from south to north annually.

When we consider the possibility of obtaining profitable returns from an investment in packages the first season the results are actually miraculous. Consider, if you will, the magic of shaking 10 or 12 thousand worker bees into a bee shipping cage in the deep South in early April, fastening a caged laying queen among the bees, and supplying them with sugar syrup in a can for food enroute by express or mail. Then imagine these bees with their queen put into a hive three or four days later in some northern state where there is perhaps a little snow still on the ground. Then visualize these young bees with the queen becoming established in the hive, developing a colony spirit and carrying on until the first young bees begin to emerge from the cells, a little over three weeks from the time the package was installed.

It is not uncommon for a package of bees installed in a northern state in April and given intelligent management during the time it is attaining colony strength, to store well over 100 pounds of surplus honey the first season. Sometimes this is accomplished in less than four months after the bees are installed.

Our hats are off to the many queen and bee breeders in the South who work night and day during the heavy shipping season to get orders out on schedule to satisfy their customers. Queens and packages from the South help to increase the honey crop, not only in the United States but also in Canada. Canadians rely on southern shippers for bees.

The package bee and queen business is an essential part of our industry and those engaged in furnishing bees and queens are rendering a most worthwhile service.

Importance of Pollen Substitutes and Supplements

AN ADEQUATE amount of pollen in the combs of a colony of bees is essential for maximum development of the hive population during the year. Comparatively little pollen is used during the winter but as spring approaches and brood rearing begins, bees use large amounts of pollen for rearing young bees.

It is not uncommon for bees on farms to visit barns containing live stock, to work on ground-up grains in food containers used by the farm animals, in order to obtain a substitute for pollen.

Some years ago, The A. I. Root Company had a large apiary near some farm buildings. Occasionally in early spring the farmer would call up to say that bees were in his barn working on the ground-up grains in the feed boxes used by his live stock. In order to divert the attention of our bees away from the barn, we mixed some sugar syrup with corn or pea meal and spread it out in a sheltered place near the hives. The bees would work on this.

The article in this issue, page 80, contains directions for feeding pollen substitutes and supplements. In some areas there appears to be a shortage of natural pollen and in others an abundance of pollen. Beginner beekeepers should inquire from experienced beekeepers in their vicinities whether or not they should feed pollen substitutes or supplements.

When package bees are installed in hives with full sheets of foundation, it is an advantage to supply some pollen substitute or supplement, especially if there is a dearth of natural pollen.

Do Honeybees Get Honey from Red Clover?

DURING THE YEARS there have been differences of opinion as to whether or not honeybees do actually store any appreciable amount of surplus honey from red clover. Some say that the amount of nectar gathered from red clover is negligible; others claim that bees work red clover and store some surplus.

Some years ago, The A. I. Root Company had a so-called red clover queen. The progeny of this queen worked red clover and apparently stored a considerable amount of surplus. It was found that the progeny of this queen had tongues that were considerably longer than the tongues of other bees. An attempt was made to propagate a strain of bees that possessed this long tongue characteristic. It was found that succeeding generations of worker bees did not have the long tongues of the first generation.

It has been observed that during a very dry season when the corolla tubes on the outer edges of the red clover heads are shorter than normal, bees do collect some nectar from that source, especially when other sources are not plentiful.

Dr. W. E. Dunham of Ohio State University, in an article used in the 1950 edition of ABC and XYZ of BEE CULTURE, writes the following:

"Several factors are involved as to whether bees are able to gather nectar from red clover, namely, tongue length, average length of corolla tubes of red clover flower, height that nectar may rise in the corolla tube, and lastly the actual tongue reach of the honeybee."

The Monthly News Letter for October 1955, put out by Gilbert Perigo, State Apiarist of Indiana, contains the following:

"There is little question but what red clover, both the medium red and the big English, are of more importance as a source of nectar available to honeybees than has been popularly assumed.

"Recently, two of the larger commercial beekeepers who are careful observers, have told me that they feel confident that at least 50 per cent of their crop in 1954 came from red clover. Just what part red clover played in the total yield of our big crop this present year when so many sources were available is difficult to say but there is no question but what in some years, red clover is a valuable source of nectar to our Indiana beekeepers."

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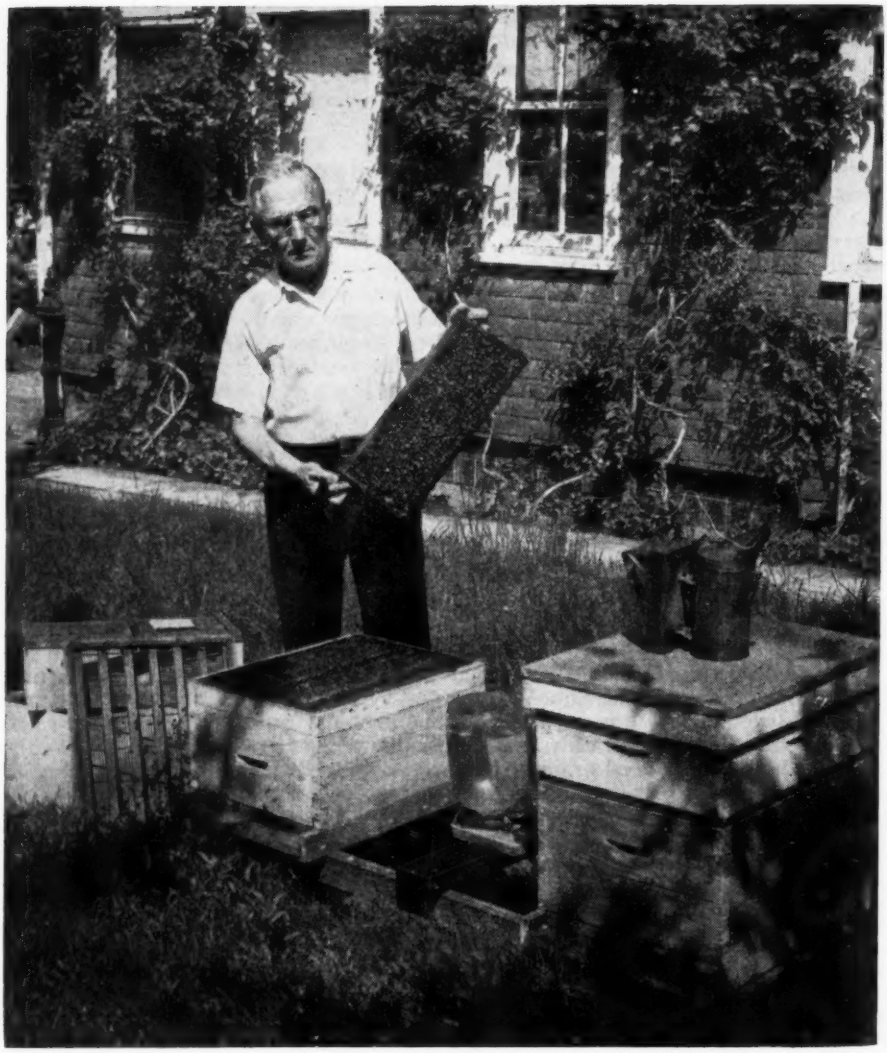
News



DEAN OF PENNSYLVANIA BEEKEEPERS. D. C. Gilham, owner of Fairmount Apiaries at Schuylkill Haven, Pa. has kept bees for more than 50 years. He is noted for his honey candy, and offers this technique for making pieces of chocolate covered comb honey: Do not mix anything with the chocolate and keep the outside of the comb free of running honey. Just take a large tray, place five strips of wood across the width of the tray (three-quarter inch thickness), and then lay an unbound-zinc excluder on the strips. Lay partly filled sections of honey on the excluder, remove the wooden section and proceed to cut into small squares. Stand each piece by itself for efficient draining. In this way the pieces of comb are free of loose honey and ready for dipping.

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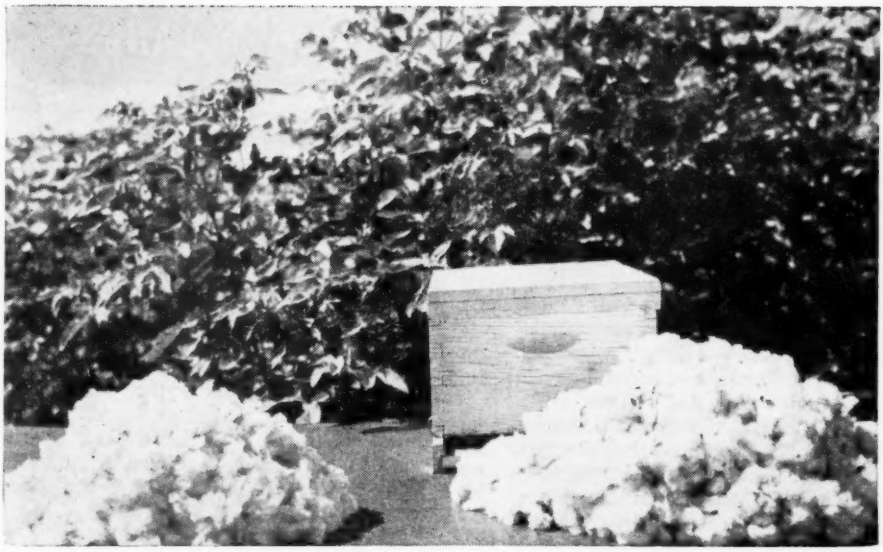
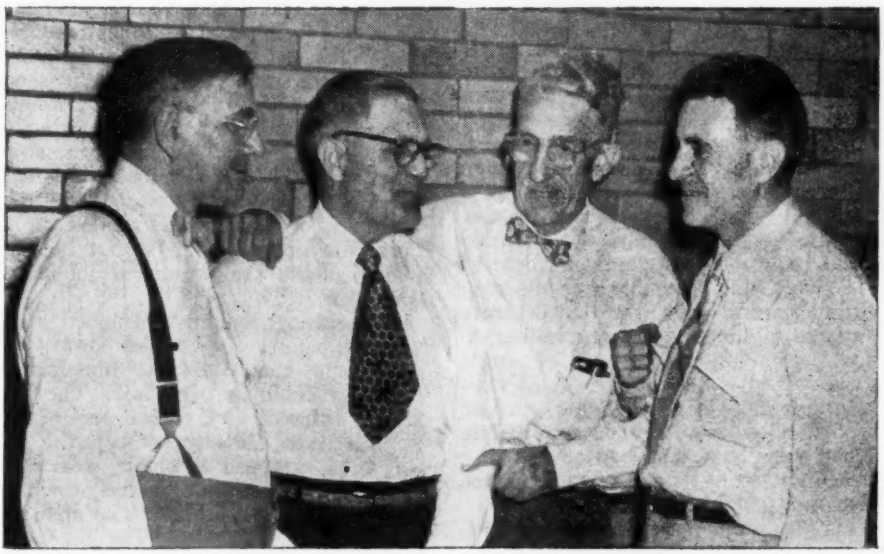


HYBRID COTTON POLLINATION. Pollination of cotton plants by honeybees increases Pima S-1 cotton production. These two piles of cotton collected from plots of 24 square yards at the Agricultural Research Service bee culture laboratory at Tucson, Arizona, show the difference bees make. The cotton pile on the left, without the benefit of bee pollination, weighs 5.5 pounds; the bee cross-pollinated cotton, right, weighs 7 pounds.—USDA photo by Forsythe.



OHIO BEE LEADERS. Left to right: W. R. Moomaw, Stone Creek; Herman Swisher, Springfield; Charles Reece, Columbus; and Alan I Root, Medina.—Photo by J. W. Buchanan.

FROM Foreign LANDS

Translated and Edited by Erika Barth

Research on Bee Dances

MR. WOLFGANG WITTEKINDT, the noted beekeeping photographer and scientist, just sent us an interesting report on his research with the dances of honeybees. The observations were made at the Institute for Bee Culture, Bonn, Germany.

The German beekeeper noticed that when bees, confined to the hive because of cold weather, were fed sugar water they exhibited a variety of dances. To analyze the meaning of these dances he did the following:

(a) Allowed free flight from a hive to a distant field and identified the returning bees with color markings, noting their time of return and the directional dance (tail wagging dance by Von Frisch). Subsequent artificial light at intervals would initiate a repetition of the directional dance. However, the direction had changed . . . . it had followed the course of the sun.

(b) Other bees were allowed a controlled flight within room range only with a sugar-water feed six and one-half feet away. The returning bees, upon reaching their observation hive, exhibited round dances (von Frisch). During the dark evening these dances could be evoked repeatedly by lighting a 60-watt bulb. By the next morning during natural light the dances were repeated, although some required additional stimulation by way of sugar water.

(c) Finally, Wittekindt took sealed brood and allowed the bees to hatch. When these bees, who had never had a free flight, were fed sugar water in the hive they exhibited the following:

(1) Shaking dances; (2) D-VAV (Milum); (3) "Directed" shake dances (Hein); (4) Tail wagging dances, and finally (5) round dances (von Frisch). Some could be induced again by natural or artificial light but required sugar water first.

Through the above observations the German scientist concluded that the dances in their various component forms have already had a start in the captive young who eventually synthesized them to attain the recognized round and tail wagging dance. Wittekindt believes that the overall observations may lead to a clearer analysis and interpretation of the dance phenomena.

Die Naturwissenschaften, October 1955.

Bee Smoker at the Battle of Trafalgar

DURING THE preparations for a Naval Exhibition which was held at the Crystal Palace many years ago, a working model of one of the ships which took part in the Battle of Trafalgar was being tried out. The engineers obtained the noise of cannon in action and smoke issuing from some port holes during the firing of a broadside, but could not produce smoke from all the guns at one and the same time. This had the engineers puzzled for a while and they realized that the whole scene would be spoiled if a broadside of smoke could not be obtained at the same time as the guns went off.

A beekeeper looking on noticed what was happening and suggested to the engineer in charge that he thought the difficulty could be overcome. The engineer offered the beekeeper five pounds if his idea was successful. It was then arranged to obtain sufficient smoke for a broadside on the principle of a beekeeper's smoker. The change-over proved successful. The beekeeper received the thanks of the engineer and the five pounds.

British Bee Journal, S. W. Gadge. Nov. 17, 1955.

Live and Learn

by Propolis Pete

SO FAR this has been the kind of winter that we never have had since gramps waded through those snowdrifts. Around the middle of November it turned cold and raw, and the bees were shut in for a couple of weeks before they had a flight. Then it got cold again and they didn't have a real flight until Christmas Day. That was a good one, and the hives turned brown between dinner and sundown.

Methinks that this spells bad news for the spring. My observation hive conked out on December 1st, after having completely used up the stores that they had. Judging by the way they used them up, I wish that my producers had about twice as much as I left with them. Not that I robbed them too closely; I left more than they ordinarily need. But just the same, I would appreciate a nice mild day to peek in and see how they are doing.

I don't like to open them up in the winter season. Anything that we do to cause confusion within hurts them more than it seems. Maybe I'll just slap on my dry feeders and let them decide whether or not they need it. If they don't and it is left over, I can always use it for feed for the packages I start every spring. That seems to be getting to be a regular routine with me. For the past few years I have been selling started packages to beekeepers who either don't know how to do it, or are too lazy to do it, or beginners who are afraid to do it. Got the idea from the poultry farmers who sell "started chicks". It pays too.

But, be that as it may, now is the time that I start to overhaul my surplus equipment. I do it every winter during the time that it isn't pleasant to work outdoors. I start the old belly stove going in the shop, stack the spare supers close by and go through the frames. I sort out the culls, and scrape the propolis off the good ones and the empty bodies. You have to be careful, because eggshells are like a steel wall compared to the fragility of a cold comb. One breath and it shatters, but if you are careful, you don't lose many.

For years I struggled with the mess of cutting out the bad combs and melting them down. Then last year I was griping about it on this page, and Mr. A. H. Gates of Garfield, Washington, came to my rescue. He wrote about a system that he had picked up and adapted to his own needs. I had heard about it, but thought it was only for the big shots. So I re-adapted it to my needs, and here is how I do it now.

I acquired an old-fashioned wash boiler—the oval kind that grandma used. I made a rack to hold the frames, set that in the boiler, with six cull combs. I put about two inches of water in the bottom of the boiler, put on the cover, and go back to work scraping propolis. In about ten minutes after the water starts to boil, I take an old butcher knife that I found in the dump one day, just run it around the wood of the frame, and there you are. If the frame had been wired, I just follow the wires. The old comb drops out in nice comfortable pieces into a bucket to be rendered later.

After I am all through, I fill the wash boiler up to about four inches from the top, dissolve a can of lye in the water and dunk the empty frames in that for five or ten minutes, depending upon how gummed up they are. They come out as clean as when they were new, with no fuss at all. I nearly forgot to tell you, my boiler isn't deep enough to completely submerge the frames, so I have to reverse them to get the gook off the other part. A word of warning here. The lye softens the wood, and eventually it comes apart in strings if you do this too often. But how often do you have to do this to a frame? Some of the frames that I do it to haven't been emptied of comb for a long time.

As a matter of fact, and believe it or not, every once in a while I run across one of the original frames that I used the first year that I kept bees. That was in 1935. I can tell the original frames because that was the only time I ever bought short top bar frames, with end staples. I had 40 of them, and while all of the comb in them don't date back so far, some does and those combs have been in constant use for 20 years.

XUM

Have a Date?

MRS. BENJ. NIELSEN
Aurora, Nebraska

Honey date pudding, hearty but light, topped with honey-sweetened whipped cream. — Photo courtesy Kellogg Company.

WELL, IF you do and will reach for the honey jar, I promise you some very toothsome treats! Dried fruits team up beautifully with Nature's golden sweet, and honey and dates make an especially fine team. Goodies combining honey and dates are flavorful, moist, and delicious. Wonderful keepers—if you can manage to keep any! These toothsome goodies are good and good for you, too.

Easy to whip up and unfailingly good!

Honey Date Pudding

Three cups oven-toasted rice cereal, 1 teaspoon baking powder, 1 cup chopped nutmeats, 1 cup cut dates, 2 eggs, ½ cup sugar, ⅓ cup honey, and ¼ cup milk.

Crush rice cereal into fine crumbs; combine with baking powder, nutmeats, and dates. Beat eggs slightly; stir in sugar, honey, and milk. Add to cereal mixture, mixing carefully. Pour into greased 8 x 8-inch pan. Bake in moderately hot oven, 400 degrees F., about 40 minutes. Cut into 4 x 2-inch pieces. Serve hot or cold with honey sweetened whipped cream or hard sauce. Yield: 8 servings.

Honey Date Muffins

One-fourth cup honey, 2 tablespoons shortening, 1 egg, well-beaten, 1 cup ready-to eat bran, ¾ cup milk, 1 cup all-purpose flour, sifted before measuring, 2½ teaspoons baking powder, ½ teaspoon salt, and 1 cup cut dates.

Blend honey and shortening. Add well-beaten egg. Stir in bran and milk. Let soak until most of the moisture is taken up, about 10 minutes. Sift flour with baking powder and salt. Add, with dates, to first mixture. Stir only until all ingredients are combined. Fill greased muffin pans or cups ⅔ full. Bake in preheated oven, 400 degrees F., 25 to 30 minutes. Yield: 8 muffins 2¼ inches in diameter or 12 small ones.

Honey Date Swirls

One-half cup butter, ½ cup brown sugar, ⅓ cup honey, 1 egg, 2¼ cups all-purpose flour, sifted before measuring, ¼ teaspoon salt, and ½ teaspoon baking soda.

Cream butter with sugar and honey. Beat until light and fluffy. Add egg. Beat well. Sift flour with salt and baking soda and add to creamed mixture. Beat until ingredients are well blended. Toss on lightly floured board. Knead until smooth. Roll out ¼-inch thick. Spread with honey date filling and roll like a jelly roll. Wrap in waxed paper. Place in refrigerator overnight to chill. Slice in ¼-inch slices. Bake on well-greased cooky sheet. Remove from pan to cake cooler immediately after baking. Yield: 3 dozen cookies.

Honey Date Filling

One-half pound pitted dates, finely sliced, ⅓ cup water, ¼ cup honey, and ¼ cup nut meats, chopped (optional).

Cook dates, water, and honey together until thick, stirring constantly. Remove from heat, add nuts. Cool before spreading on cooky dough.

XUM

Bee Facts

(A Digest of Scientific Research)

Edited by Walter Barth

More about the Mating of Queens:

DESPITE MANY years of intensive research and observations on the honeybee, science continues to turn up new and interesting facts. Only recently it was determined that the queen honeybee may mate six or seven times with different drones.

Now comes the information that this sperm does not mix appreciably in the spermatheca (the spermatheca is a sac or reservoir in the queen's body where the sperm is held until it is used to fertilize the eggs). It is not known what factors are responsible for this fact but it appears that the sperm clumps or sticks together in the spermatheca. It is stated that after a year or more the sperm may become somewhat mixed.

This fact may explain why failure occurs in some colonies, at least in part, and it may also explain why the progeny of a so-called "tested queen" may not prove to be as good as their predecessors. The whole phenomenon is well explained by the author who states, "It is conceivable that when a breeding queen mates with five genetically desirable drones and one less desirable drone, large numbers of daughter queens could be raised from eggs fertilized with sperm from the one undesirable drone."

Though this fact may be disturbing to queen breeders and those interested in securing pure or the best stock, there is consolation in the fact some of the former mysteries of queen rearing are now known. This piece of USDA research will lead to a better understanding of queen rearing and through science our beekeeping will improve.

Taber, Stephen III.
Sperm distribution in the spermathecae of multiple-mated queen honeybees. Journal of Economic Entomology. 48: 522-25. 1955.

What Pesticide Dusts are Toxic to Honeybees? Which Ones Are Harmless?

E. L. ATKINS, JR., and L. D. Anderson of the University of California found that the following pesticide dusts were **highly toxic** to honeybees: DNOSOBP, EPN, sabadilla, lindane, BHC, heptachlor, Chlorthion, Metacide, aldrin, dieldrin, Diazinon, malathion, methyl parathion, parathion, TEPP, compound A-42, compound 340, endrin, and chlordane.

Moderately toxic materials were: Potasan, compound 21/116, Q-137, DDT, calcium arsenate, isodrin, compound 1189, tartar emetic, Chlorobenzilate, compound 21/199, cryolite, compound 876, ryania, NPD, TDE, R-242, schradan, methoxychlor, DNOCHP, Aramite, and toxaphene.

Relatively safe materials were: sulfur, rotenone, Ovotran, chlorinated terpine, compound Q-128, pyrethrins, compound 923, Neotran, CMU, demeton, allethrin, DMC, Cunilate, CS-708 and nicotine.

To be sure of their results, these California scientists from the Citrus Experiment Station at Riverside, repeated each pesticide test nine or more times. In each series of tests a dosage of five percent DDT dust was used as the standard treatment, in addition to untreated tests. Each chemical was prepared as a dust, using pyrophyllite as the diluent.

Schradan, found to be moderately toxic by the Californians, is stable in the stomach of a bee. The material is also stable in honey for two and one-half months after treatment.

Atkins, E. L., Jr., and L. D. Anderson, J. Econ. Ent. 47(6):969-972. Dec. 1954.

XUM

Asked & Answered

Cause of Granulation

Question: Please tell me in non-technical terms just why honey granulates and the changes that occur in granulation. —New Jersey.

Answer: Well-ripened honey is composed, chemically speaking, of two sugars in about equal proportion. These are levulose and dextrose. Levulose does not crystallize readily, while dextrose does. When honey granulates it is the dextrose which crystallizes, while the levulose remains liquid to a large extent and fills the spaces between the crystals of dextrose. Honey granulates (or, rather, the dextrose in honey crystallizes) because honey is a super-saturated solution. That is, there is so little water in it and so much sugar that it can not stand long in the liquid form under certain conditions. Granulation may be hastened by stirring the honey or moving about the vessel containing it, and apparently rapid changes in temperature hasten granulation. It can also be hastened by mixing in a small amount of honey that has already granulated, thus adding crystals of dextrose causing other crystals to form. In liquid honey that is almost transparent there may be millions of minute crystals, even though the honey appears to be in a perfect liquid condition. Each of these crystals forms a nucleus for the growth of larger crystals. When honey is heated to 160 degrees F., these crystals are destroyed, thus greatly delaying granulation. This is the reason for heating honey when bottling.

Appearance of Unripe Honey

Question: What is the appearance of unripe honey?—New York.

Answer: While still in the combs, the unripe honey is in cells that are not capped, and if still quite thin it can be shaken out of the combs or it may spill out of the cells if the combs are held in a horizontal position. Newly gathered nectar is not always so thin as this, however, especially in a dry climate or during a dry season. If extracted before it is ripened, honey is thinner than when it is well ripened. Unripe honey, if kept for some time, usually begins to ferment. When it does this the flavor is impaired and often the cans become swollen, sometimes even bursting. Western honey, produced in the irrigated regions where it is dry runs from 11 pounds and 14 ounces to 11 pounds and 15 ounces and in rare cases to fully 12 pounds to the gallon. Eastern honey or where it is more moist will run from 11 pounds and 12½ ounces to 11 pounds and 14 ounces. A honey as low as 11 pounds and 12½ ounces to the gallon or 18 per cent water content is liable to ferment if allowed to stand unless heated to 160 degrees F. to kill the yeast germs.

Bees Suddenly Become Cross

Question: Can you explain why bees become so viciously cross all of a sudden when at other times they are gentle?—N. Carolina.

Answer: The temper of the bees depends largely upon the character of the honey flow. Where there is an abundance of nectar available during most of the day the bees are usually good-natured, but if nectar is available only a part of each day the bees are liable to become cross when the flowers quit yielding. When the honey flow closes suddenly the bees are usually cross. As the season advances the bees are apparently more inclined to sting than early in the season. Beginners especially should bear these things in mind and use more precautions against stinging when the flowers are not yielding and as the season advances.

Double Brood Chambers

Question: This coming season I would like to try leaving the food chamber on the brood chamber the year round, supering above the double brood chambers. —Ohio.

Answer: The method of leaving the food chamber on the bottom brood chamber during the entire season, supering above the double brood chamber, should work in your locality. That is the method we follow in the production of extracted honey; in fact, we have been following it now for some years successfully. The main thing is to super liberally so that there may be no congestion in the double brood chamber. This is the simplest method of operation that we know of. We use the top supering method.

Bee Club Celebrities

Maxine Manchester, Middlebury, Vt. Secretary of the new Eastern Apicultural Society.

Hoyt Taylor, Secretary of the Illinois State Beekeepers' Association.

Harold Fredriksen, 1955 President of the California State Beekeepers' Asso.

Left, Grant Terry, President of the Los Angeles County Beekeepers' Asso. with A. D. Phillips, Co. Apiary Inspector.

Labor-saving Methods for Part-time Beekeepers

M. W. KOSANKE, Ripon, Wisconsin

FOR THE most part the sideline beekeeper has to operate his colonies the hard way as he does not have enough colonies to make it practical to own expensive labor-saving devices. However, there are other ways he can reduce the labor in beekeeping and make it more efficient and profitable.

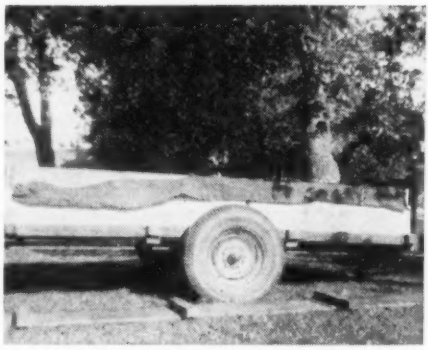
The greatest help in beekeeping that I have experienced is that of having a small building located in the apiary. However, one must have a permanent location for his apiary to make this practical. If he does not have a permanent location then it would not be very feasible to erect such a structure in his bee yard.

The advantages of such a building are many. In a building of this type the beekeeper may store his extracting supers, excluders, feeders, extra hive bodies, bottom boards, covers, and miscellaneous equipment. In addition he can have tools for immediate repair of equipment right on the spot. The building will protect equipment from the elements at all times during the year, keeping deterioration at a minimum. With equipment as expensive as it is, this is a very important factor in today's beekeeping. In addition protection from mice and moths can be made more efficient than when they are stacked out of doors. The greatest advantage of all is that you have all the proper equipment in the apiary for instant use and in top condition at all times. This is very important just prior to and during the honey flow. Many times when the honey flow is on, the beekeeper does not take enough supers with him and will have to make an extra trip. This means lost time and extra labor at a time when one has to be as efficient as possible to secure a maximum crop of honey.

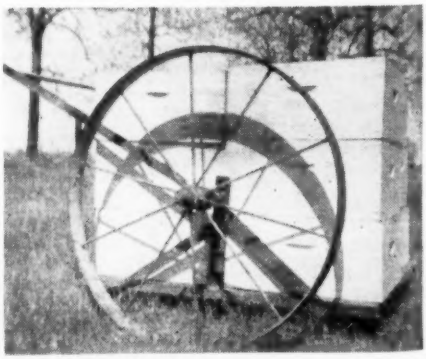
A Trailer Comes in Handy

Another important labor-saving item in my beekeeping operations is a moderately priced trailer that I use in hauling supers to and from the extracting

Small apiary building.



A moderately-priced trailer can be a big help to a part-time beekeeper.



This cart is ideal for carrying supplies around the apiary.

room. The trailer is very low, the platform being only 18 inches above the ground. It is very maneuverable and can be drawn or backed very close to the hives so that the supers can be loaded with very little effort. The trailer has a platform ten feet in length and five and one half feet in width. If you double deck the load, and this requires just a little more extra effort, 24 full-depth supers can be hauled. This is an ample amount for one man to extract in one day.

When I do not wish to use the trailer in taking empty supers from the yard house to the hives I use a cart that I built from odds and ends of scrap. This cart cost only a few dollars and saves a lot of extra steps.

During the honey flow when removing supers for extracting from colonies that are five and six supers high, it requires a lot of hard work to place the supers on a bee-escape board on top of the colony. To do away with most of this heavy lifting I place a bottom board beside the hive and on it a bee-escape board. The supers that I wish to extract are placed on this stand and covered carefully so that they are bee tight. I usually place two supers on such a stand and in about two days all of the bees have passed down and out of the supers and returned to the parent hive. This method requires a little extra equipment but eliminates a lot of hard lifting when the hives are stacked high.

Honey Production for the Small Beekeeper

LEONARD HASEMAN, Columbia, Missouri

UNTIL THE beginner has sufficient colonies to justify the purchase of an extractor he will usually market his surplus as cut comb honey. But he may use the equipment and the essential manipulation used by the producer of extracted honey. It requires less skill to handle bees in extracted honey production than for successful comb honey production. The problem of swarm control in particular is greatly simplified where extracted honey is produced and, as a rule, it is easier to shape the colonies for successful wintering.

In this case the supers will carry either deep or shallow extracting combs which, when filled and capped by the bees, may be uncapped, the honey extracted, and the empty combs returned to the colonies for refilling. It does save the production of new comb each time. The busy beekeeper can put on extra supers at the beginning of the nectar flow so that the bees are assured of storage room later without so much attention on the part of the beekeeper.

The experienced producer of extracted honey, however, finds that it pays to carefully handle the addition of supers so as to keep the unfilled ones next to the brood nest where the bees can reach them with the least amount of traveling in the hive. Where out-apiaries are not visited very often several supers of drawn comb are given to each colony when the season opens and they are taken off and extracted when filled, or at the close of the nectar flow.

Much more extracted honey per colony may be secured than comb honey but it sells at a lower price and, as a rule, first class section honey is in greater demand in both markets. However, extracted honey can be held for a later market, where it is unsafe to hold section honey too long. No one can say which type of honey is best to produce as local conditions and demands for honey vary. It is safe, however, to advise the beginner to learn beekeeping by starting out with the simpler work of extracted honey production.

Comb Honey Production

Comb honey production is particularly attractive to the beekeeper of some experience who is fortunate enough to have a dependable and heavy white clover flow and whose local market demands comb or section honey. In comb honey production each colony is built up to full strength and when the nectar flows open section supers are put on and the bees are literally squeezed or coaxed up into the

(Continued on page 123)

Let's Talk about Honey Plants

HARVEY B. LOVELL, University of Louisville

Mesquite (Prosopis juliflora)

Mesquite. From Texas to Southern California, one of the most important honey plants is mesquite (**Prosopis juliflora** var. **glandulosa**), also known as honey mesquite, honey pod, and in Hawaii as algaroba.

The early Indians made a meal from the pods which was one of their principal foods. In recent years with the destruction of the original chaparral, this tree has extended its range northward hundreds of miles into southwestern Oklahoma, Utah, and Nevada.

Mesquite has been likened to an old straggly apple tree in general appearance (see photo). In Texas it usually has two blooming seasons, one in April and the other in June and July. When I crossed Texas in late June, I found the trees just coming into bloom all across the state. If it rains when the tree is in bloom the flower clusters (locally called tags) immediately drop off, and the tree makes a rapid vegetative growth, sending out new branches and leaves. When the weather becomes dry, the tree bursts into bloom.

E. B. Ault of Weslaco, Texas, wrote me that his largest surplus was 200 pounds per hive, and his average in a good season is about 75 pounds. J. D. Beals from Harlingen, Texas, also wrote me that he sometimes makes as much as 200 pounds with strong colonies, with an average of 60. He says the flowers yield best early in the morning. Although the honey is variously described as white to light amber, on a Pfund grader it runs 30 to 40 according to that expert honey packer T. E. Burleson.

Mesquite trees are often considered a nuisance on cattle ranges and are destroyed by dragging heavy chains across the fields, or killed by spraying with brush poisons. In the panhandle of Texas we drove through thousands of acres of pastures where all the trees had been killed in this way. To a beekeeper or to a lover of trees, it was a sad sight to see the trees reduced to dead skeletons, and the birds trying to nest in the hot desert sun without a scrap of shade.

Arizona. From Alva Mills of Buckeye, I have just received a fine jar of mesquite honey which is very light in color and has a fine, mild flavor. He writes that his early honey in April and May is a mixture of palo verde, mesquite, catsclaw, ironwood, and cactus, the mixture being white and mild. In June and July, he obtains a surplus from alfalfa which he describes as light amber with a mild flavor. From July to October the honey plant is cotton which produces a white, mild honey which is thin if it rains, but otherwise has a heavy body. Another important honey plant is squaw bush (probably **Lycium fremonti**) which blooms in January and February and is very useful in early season build-up. He adds, "Mesquite honey is considered as white honey but sometimes the palo verde honey mixed with it causes it to be light amber."

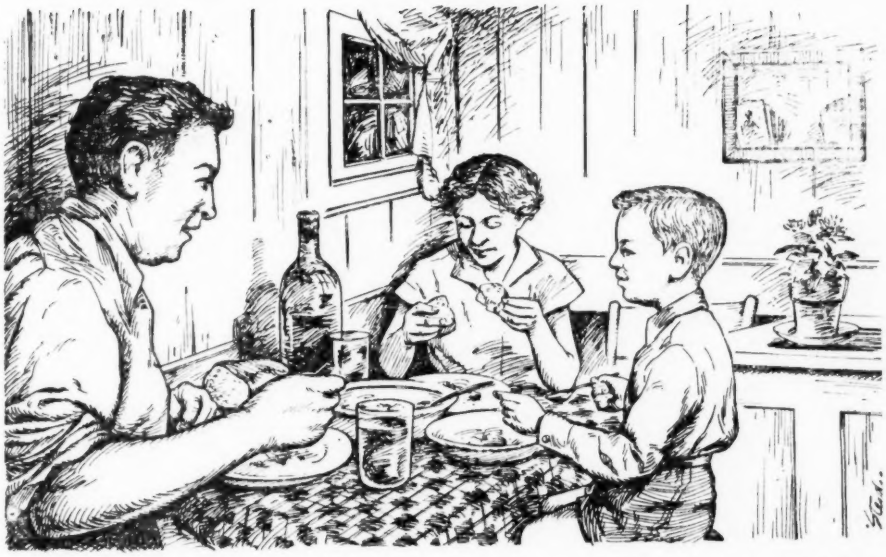
California. I purchased a five-ounce jar of mesquite honey from the Tontz Honey Farm, Elsinore. It is very similar in appearance and flavor to the Arizona sample. Soon after I received it, it crystallized with a fine grain and took on a yellow hue. Mr. Tontz features honey according to its floral source, including such flavors as orange blossom, purple sage, desert alfalfa, and a wild flower honey, the latter a mixture of wild alfalfa, lupine, silver sage, and wild buckwheat.

New Mexico. Oscar L. Poe of Las Cruces told me that mesquite was his first and best honey, a sweet, heavy honey with almost no flavor. It was white to extra light amber in color. He added that tornilla or screw bean

(Continued on page 124)

Bee Lore

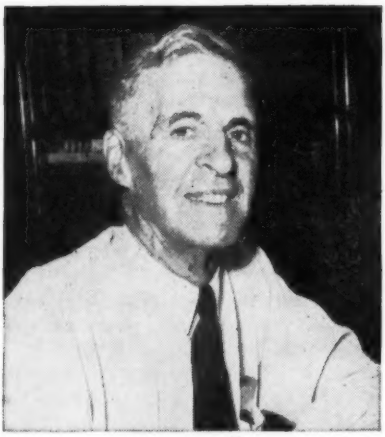
Illustrated by V. R. Stephen



CANDLEMAS, a Catholic holiday that occurs on February 2nd, has collected some local legend in Germany. Near Mecklenburg, the bees will certainly swarm if Candlemas is bright and clear. If beekeepers in the vicinity of Waldeck travel or go visiting on Candlemas, their new swarms will fly away the following season for the beekeeper will be unable to retrieve them.

A Talk to Beekeepers

M. J. Deyell



Jack Deyell

Talking to a Mixed Audience

WHEN I TALK to a person I try to give him or her a chance to get a word in once in awhile. In this talk to an unseen audience, you do not have a chance to get a word in unless you write me, and I would appreciate your doing so, especially if I fail to make matters clear.

I am at a disadvantage in that I am talking to beekeepers of different ages, with different kinds of experiences, some just beginning beekeeping with one or two hives, others with many years' experience with perhaps hundreds of hives. In fact, some of you may know a lot more about beekeeping than I do.

My position is comparable to speaking to a group of students in different grades or classes, in which case those in the higher grades would doubtless understand what I try to put across, whereas those in the lower grades would not.

The pastor of our church has what he calls the children's sermon each Sunday, prior to the main sermon. Since I sing in the choir and can watch the expression on the faces of the audience I have noted that quite a number of the adults apparently get something out of the children's sermon.

In my talks throughout the year if I manage to make what I try to say so clear that beginners and inexperienced beekeepers can easily grasp the ideas I wish to convey, then it is likely the more experienced beekeepers will understand.

February a Treacherous Month in the North

Speaking of February I am reminded of the old colored gentleman who said that he had lived a great many years and had always noticed that if he managed to live through the month of February that he lived through the remainder of the year.

February is a rather critical month for bees in the North. As a rule, bees in the middle North, from the 40th to the 45th degree latitude, get a good cleansing flight some time during January or February. Occasionally, however, bees are kept in their hives during the two coldest months of winter. In the far North bees may be kept in their hives from the latter part of November until early April and when this happens it is quite necessary that they have an adequate amount of stores of good quality and ample protection from the elements.

Cellar Wintering

When I kept bees commercially in Northern Michigan during 1917 and 1918, I wintered bees in a cellar. The first winter the bees were not put into the cellar until December. Our first child was born in late November during the time bees are usually put in cellars and this event interrupted our beekeeping program somewhat.

The hives were completely covered with snow during that very snowy winter and likely would have wintered well outside, with the heavy snow protection. I realized afterwards that it was a mistake to dig the hives of bees out of the snowdrifts and haul them into the bee cellar.

Those who winter bees in cellars should know the importance of having good stores and the correct temperature in the cellar during the time the bees are in winter quarters. A temperature between 40 and 45 degrees F. is ideal for cellar wintering. The cellar should be dark.

Bees are Hard to Kill

In 1953 when I made that 9,000 mile drive through some of the western states and western provinces of Canada I had a visit with Mr. W. G. le Maistre, of Edmonton, Alberta, the provincial apiary inspector. He told me some interesting facts about beekeeping in that province. He mentioned one beekeeper who got tired of beekeeping and wanted to get rid of the hive of bees he had, so he put it in a wind-swept location near the edge of a lake and pried up one corner of the cover in order to make sure that the bees would freeze during the winter. Imagine his surprise in the spring when he visited the hive and found the colony very much alive.

In relating this incident I am not belittling the importance of adequate protection for bees against cold weather, but I am simply stating what some beekeepers have found out that a strong colony of bees with an ample amount of stores of good quality will stand a lot of cold weather. It seems possible that this beekeeper making a small upper entrance under one corner of the hive cover may have given the bees in the cluster a chance to expel some of the excess moisture that accumulated during the cold winter months.

Bees Generate Their Own Heat

Occasionally I ask beekeepers attending bee meetings how their bees keep warm during the winter. They usually say, "Oh, they just huddle together and keep warm".

It seems that quite a number of beekeepers do not actually know how clustered bees manage to live through the winter. As a matter of fact none of us know too much about it. I have read all of the bulletins and articles on the subject that I can find and still there is something mysterious about it, for me at least.

In short, as the temperature outside the hive and surrounding the bees rises during cold weather, the bees form a cluster and those in the center are clustered loosely and generate heat by muscular activity while the bees on the outside form a shell about two or three inches thick with their heads pointing in and bodies close together. The bees on the outside or shell of the cluster retain a large portion of the heat generated in the center of the cluster. The temperature in the middle of this cluster never goes below 57 degrees F. while the temperature on the outside or shell may go down to between 43 and 46 degrees. This is indeed a marvelous phenomenon.

Dreaming of Spring

Beekeeping is a seasonal business. During the height of the season when bees are carrying in honey rapidly, colonies are likely to swarm if not given ample comb space and we are so busy we do not have time to do much dreaming. However, on cold days of winter we can sit back and dream of bygone days in the apiary, also imagine we are out among the bees during a beautiful summer day.

This is a good time of the year to recall mistakes we have made in apiary management and try to outline a method of management that should bring better results this coming season.

We should be getting ready for spring. Those of us who have workshops where bee supplies are stored, can utilize our spare time by sorting combs, painting supers, assembling hives and frames, and doing other work that needs to be done before the active season is on.

One thing that makes beekeeping so intriguing is that we never know what the coming season may bring and we have to be ready for any emergency.

Why Keep Bees?

All of us should ask ourselves the above question once in a while.

I suppose the reason most of us keep bees is that we happened to get started in the business and have continued. Someone has said that "Once a beekeeper, always a beekeeper".

There seems to be a difference between a real beekeeper and a keeper of bees. I happen to know some "keepers of bees" who seldom look inside a hive until they find a swarm hanging on a tree near their hives. If they happen to have an extra hive the swarm will be put into it, if not, the swarm will go to the woods. Such bees are of little use to the beekeeper unless they render a pollinating service in his orchard or vegetable garden.

It seems safe to say that if the average beekeeper, back-lotters and commercial beekeepers would give their bees intelligent management throughout the season, the amount of surplus honey produced in this country could be easily doubled or trebled.

Knowledge of Bee Behavior Very Important

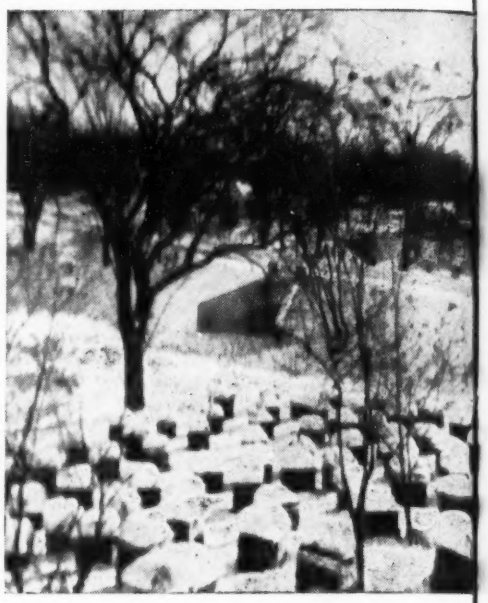
The farmer who wishes to make some profit from his cows, hogs, or poultry knows something about the habits of these animals before he can realize a profit from them. It is the same with beekeeping. It would appear that most of the failures in beekeeping are due to faulty manipulation of colonies of bees, this, in turn, being due to the lack of knowledge concerning bee behavior. We shall have more to say on this matter later.

Most sideline beekeepers have bees for pleasure as well as to secure some honey for table use and incidentally to realize some fun as a sideline. There are thousands of back-lot beekeepers in towns and cities. In some instances, bees fly quite a distance to obtain nectar and pollen. However, such bees usually store some surplus during a favorable season.

Who Should Keep Bees?

Some one has said that beekeepers are born not made. This is not always the case. There are, however, some who seem to have a natural aptitude for beekeeping, while others never seem to catch on to the tricks of the trade. Anyone who likes the business and has the determination to master the fundamentals that make for success, can undertake beekeeping and be successful.

There is nothing difficult about beekeeping. You simply get the bees, packages or swarms, and put them into hives, keep them well fed until the colonies are built up to good strength, then at the beginning of the main honey flow, put on supers to hold the surplus honey, take off the honey at the close of the season, leaving enough for the bees to live on during the winter. Of course, beekeeping is not quite as simple as this may sound but it boils down to getting some hives of bees, then seeing to it that they have three things—food, comb space, and protection. Details of management may be acquired as you go along through the season. These will be elaborated upon in future issues.



Where to Keep Bees

Hives of bees are kept in all sorts of places—on flat roofs of buildings in towns and cities, in rooms of dwelling houses, entrances of hives facing out through walls or windows, and in back lots, a reasonable distance from streets and highways. It is well, if possible, to have hives in some spot reasonably protected from the prevailing winds and surrounded by a hedge or row of trees so that the bees when they fly to the fields must go up and over so do not come in conact with people near by.

Fundamentals of Beekeeping

In order to secure the maximum crop of honey, there are at least four requirements—first, good beekeeping equipment; second, good bees; third, intelligent apiary management; fourth, a good beekeeping location. There is, in reality, a fifth requirement, namely, there must be suitable weather for bee flights during the time the surplus honey is stored.

Anyone can produce some honey during a good season but it takes a good beekeeper to secure the maximum crop during a poor season.

Just News

The winter meeting of the **Connecticut Beekeepers' Association** will be held at the auditorium of the Connecticut Agricultural Experiment Station, Huntington Street, New Haven, Conn., February 18, 1956 at 10:00 A.M. A member of the staff at the Experiment Station will talk on insects and entomology in general. Lunch will be potluck, each person bringing a covered dish. Coffee will be furnished. The Connecticut Agricultural Experiment Station, Host, and the Connecticut Beekeepers' Association extend a warm welcome to all beekeepers and others who would like to come.—Philemon J. Hewitt, Jr., Chairman of Publicity.

The **Virginia State Beekeepers' Association** and the **Piedmont Beekeepers' Association** will hold their winter meeting in Lynchburg on February 17, and 18. The Piedmont Beekeepers will hold their session the evening of February 17, and the State Association will meet on February 18. You are invited to attend both meetings. We expect to have some out-of-state speakers as well as some local speakers. The meetings will be held in the directors' room of the Quality Dairy.—Henry W. Weatherford, Sec.-Treas.

The **Westchester County Beekeepers' Association** will hold its next meeting at the Odd Fellows Hall, 20 Lockwood Ave., New Rochelle, N. Y., on Sunday, February 19th at 2:30 P.M. Refreshments will be served by the "Queen Bees".—Mrs. Alfred Roth, Publicity.

There will be a meeting of the **Florida State Beekeepers' Association** February 7 beginning at 10 A.M. at the Community Building at the Civic Center in Lakeland. Meeting is open to all Florida beekeepers and all out-of-state beekeepers who happen to be in the state at that time are welcome.—Millard Coggshall, President.

The **Cook DuPage Beekeepers' Association** will hold its annual meeting and banquet Saturday afternoon and evening February 18, 1956 at the Victor Lawson Y.M.C.A. State Street and Chicago Ave., Chicago, Ill. A program is being arranged. We are going to have Mr. John Nash Ott who will show his bee and flower pictures. Mr. Ott is on T. V. Channel 5 every Saturday afternoon with "How does your Garden Grow". Anyone wanting further information contact the secretary.—A. J. Smith, Box 234, Rt. 1, Worth, Ill.

The annual monthly meeting of the **Southern Tier Beekeepers' Association** will be held a 8 P.M., February 14 in the Farm Bureau Conference Room, City Court House. Every one welcome. A light lunch will be served. Dues and subscriptions are now due. The picture for the evening will be "The Miracle of the Bee".—H. B. Webb, Sec.

The February meeting of the **Middlesex County Beekeepers' Association (Mass.)** is to be held on Saturday, February 25, 1956, at the Waltham Field Station, Trapelo Road, Waltham. There will be a pot-luck supper at 6:30 P.M. followed by a brief business meeting. The speaker of the evening will be Mr. Caswell of Middleboro, Mass.—L. C. Proctor, Secretary.

The **Kansas Beekeepers' Association** meeting will be held on February 7, 1956, Room 102, Fairchild Hall, Kansas State College, Manhattan, Kansas.

A Correction—Referring to page 27 of January 1956 Gleanings, Leroy Stockdale is Treasurer of Illinois State Beekeepers' Association and not the President.

Eastern Apicultural Society invited to Pennsylvania—Appreciation for expansion in the bee research program at the Pennsylvania State University and a request for increased research personnel were expressed by the Pennsylvania State Beekeepers' Association at its annual Farm Show meeting.

Most urgent of the bee research needs were listed as work on AFB disease-resistant stock, improved honey-producing strains of bees, remedies for other general bee diseases, and prob-

(Continued on page 121)

Buy and Sell

Only responsible advertisers and honest advertisements will be admitted to these columns. References required from new advertisers not known to us. Rate: 18c per counted word, each insertion. Each initial, each word in names and addresses, the shortest word such as "a" and the longest word possible for the advertiser to use, as well as any number (regardless of how many figures in it), count as one word. Copy should be in by the 10th of the month preceding publication.

HONEY FOR SALE

WE BUY AND SELL all varieties of honey. Any quantity. Write us for best prices obtainable. The Hubbard Apiaries, Onsted, Michigan.

IOWA honey, one can or truck loads. Russell D. Smalley, Beaver, Iowa.

CLOVER extracted honey in sixties. Abram Brubaker, Lancaster, Pa., Rt. 2.

WHITE CLOVER extracted honey. Roediger Apiaries, Anna, Ohio.

HONEY AND WAX WANTED

BEEKEEPERS TAKE NOTICE—We can not guarantee honey buyers' financial responsibility, and advise all beekeepers to sell for cash only or on C.O.D. terms except where the buyer has thoroughly established his credit with the seller.

CASH for all types extracted honey. Send sample and best price. Buckeye Honey Co., 3930 No. High St., Columbus 14, Ohio.

CASH FOR BEESWAX. Write as to quantity and we will quote price. Muench-Kreuzer Candle Co., Inc., Syracuse, N. Y.

HONEY WANTED — All grades and varieties. Highest cash prices paid. Mail samples. State quantity. HAMILTON & COMPANY, 2613 South Yates Ave., Los Angeles 22, California.

WRITE FOR Shipping tags and quotations on rendered beeswax. We buy from one pound up and if you have over 25 pounds let us work it into foundation for you at a 25 per cent saving. Walter T. Kelley Co., Clarkson, Kentucky.

HONEY WANTED, all grades in 60's. Mail samples, advise quantity, best price. A. I. Root Company of Syracuse, 1112-14 E. Erie Blvd., Syracuse, N. Y.

WANTED — White extracted or comb honey. Send sample. Millersport Honey Company, Millersport, Ohio.

WANTED—White clover honey, carload or truckload. Send sample and lowest price. Cloverdale Honey Co., Fredonia, New York.

BEST CASH DEAL for your honey (any grade) and beeswax. Alexander Company, 819 Reynolds Road, Toledo, Ohio.

BEESWAX WANTED — Highest prices paid in cash or trade for bee supplies. The A. I. Root Co., Medina, Ohio, Council Bluffs, Iowa. San Antonio, Texas.

WANTED—All grades of extracted honey. Send sample and price. Deer Creek Honey Farms, London, Ohio.

WANTED, chunk comb and extracted honey. Mail sample and prices. Stoller Honey Farms, Latty, Ohio.

SELL US your honey. We pay cash. Tideswell Supply Company, 2711 No. 63rd Stree, Omaha, Nebraska.

WANTED all grades extracted honey. Cash, state amount, and grade please. Honeymoon Products Co., 39 E. Henry, River Rouge 18, Michigan.

WANTED—Buckwheat and amber honey. Eastern Food Products, 115 Division Ave., Brooklyn, N. Y.

WANTED—Honey in sixty-pound cans, also beeswax, any quantity. L. E. Allen, Tipton, Mich.

WANTED—Sumac honey. Frank Fekel, Almond Road, Vineland, New Jersey.

CASH for Amber and Buckwheat Honey. Best cash price for wax. Hubbard, Onsted, Michigan.

FOR SALE

WRITE FOR CATALOG — Quality Bee Supplies at factory prices. Prompt shipment. Satisfaction guaranteed. The Hubbard Apiaries, Manufacturers of Beekeepers' Supplies and Comb Foundation. Onsted, Michigan.

THE BIGGEST BEE SUPPLY Catalog published (64 pages) free for the asking. Listing many items not found in other Catalogs. No agents—buy direct and save 20%. WALTER T. KELLEY CO., CLARKSON, KENTUCKY.

FOR SALE — New heart cypress 10-frame bottom boards. KD., 10 or more, $1.00 each; 50 or more, 90 cents each; 100 or more, 85 cents each. One nailed up sample postpaid, $1.25. Fred L. Poole, Elizabethown, Rt. 2, Box 67, No. Car.

FOR SALE — 8-frame Root equipment for 700-colony apiary. Write for details to E. H. Wadleigh, Monte Vista, Colo.

QUEENBEE PAINTING OUTFITS, $1.50 postpaid. Southwick Apiaries, Waban, Massachusetts.

FOR SALE—100 8 and 10-frame colonies of bees, with 300 supers. J. R. Mc Clellan, Fillmore, Mo.

FOR SALE—400 colony beekeeping outfit. Will sell complete or any part. Good truck. Write for particulars. Wilson Mitchell, Boyne Falls, Michigan.

FOR SALE—426 supers of drawn combs, 183 bottom-boards, 164 covers, 158 inner covers, 145 moving screens, 74 excluders, 37 extra empty supers, 1 24-frame Simplicity extractor, 1 large uncapping tank, 19 supers foundation wired in. All standard equipment, $1,250.00. Earl De Long, R. 2, Box 283, Snohomish, Wash.

"Konigs Vulkan" bellowless smoker. Spring motor. Control lever governs smoke output. Successfully used 50 years in Germany. $6.00 each. Vimtrup, Carpenter St., Downers Grove, Ill.

SEND OR BRING CAGES. Will supply bees for 75 cents pound. Will sell 100 to 200 ten-frame colonies on good titi tupelo gallberry locations. A. V. Dowling, Valdosta, Ga.

40 colonies. Write for details. MOREHOUSE, Montevideo, Minn.

BEES AND QUEENS FOR SALE

We use all possible care in accepting advertisements but we cannot be held responsible in case disease occurs among bees sold or if dissatisfaction occurs. We suggest that prospective buyers ask for a certificate of inspection as a matter of precaution.

ITALIANS — Packages, queens. Martz, Rt. 2, Box 846, Vacaville, California.

Three and four-frame nuclei for sale, one or a truckload. Walker Apiaries, Pharr, Texas.

CAUCASIANS—2-lb. package, $3.50; 3-lb. package, $4.50. Untested queens, $1.00 each; 100 for $85.00. Lewis & Tillery Bee Company, Rt. 3, Box 90, Greenville, Ala.

FOR SALE—Quality queens. Lynn Williams, Box 5760, Holly Lane, Paradise, California.

PACKAGE BEES—Take a vacation on your express money. Come for your bees; be our guest while here. 1800 hives to shake. Booking orders now. MILLER BROS., SAFFORD, ALA.

ITALIANS and Carniolans Bees and queens. Luther Pickett, Efland, N. C.

MISCELLANEOUS

ROYAL JELLY. 30 capsules $1.50. Capsule contains Royal Jelly, 10 mg., Vitamin B, 5 mg., Calcium Pantothenate, 5 mg. Eight-ounce jar honey with 320 mg. Royal Jelly $2.00 or $18.00 per dozen. Prairie View Honey Company, 12303 12th Street, Detroit 6, Michigan.

"Adventures in Beekeeping." Illustrated. $2.00. Robert Oglesby, R. R. 1, Middletown, Ohio.

PLAIN or wavywired foundation. Beeswax rendered and purchased. Wax Workers, Ithaca, New York.

WANTED: Large outfit of bees—200 to 2000 colonies in Midwest. Ten-frame standard, extra supers preferred, no honey house, truck or equipment necessary. Box 224, Gleanings, Medina, Ohio.

WANTED: One used Cellulo No. 8 Disc Filter. R. D. Burgess, 1805 Edgewood, N. E., Warren, Ohio.

SEEDS

HONEY PLANTS our specialty. Catalog on request. Pellett Gardens, Atlantic, Iowa.

HONEY LABELS

Improved designs, embodying color, balance, simplicity, and distinction. Please send for free samples & prices.

C. W. AEPPLER COMPANY

Oconomowoc, Wisconsin

HOWARD WEAVER'S
Caucasian Bees & Queens

Our 1956 Prices

Quantity	1 to 9	10-48	49-100
2-lb. w/q	$4.00	$3.75	$3.50
3-lb. w/q	5.00	4.75	4.50
Queens	1.35	1.25	1.15

Book early and be assured of your favorite shipping dates.

HOWARD WEAVER
Navasota, Texas

NORMAN BROS.
PACKAGE BEES & QUEENS

The Foundation of our business is now and has been for the past 34 years to furnish you with the best BRIGHT 3-BANDED ITALIANS that money can buy. Let us book your order now and serve you the best for 1956. Full weight, safe arrival, health certificate and satisfaction.

— PRICES —

	1-11	12-100
2-lb. pkg. with queen	$3.75	$3.50
3-lb. pkg. with queen	4.75	4.50
Untested queens	1.10	1.00
Tested queens	2.00	

NORMAN BROS. APIARIES
RAMER, ALA.

Italian Queens
EUGENE WALKER
Rt. 2, Box 892
Live Oak, California

HONEY WANTED

Carloads and less than carloads. Mail sample and best prices in all grades.

C. W. AEPPLER COMPANY
Oconomowoc, Wisconsin

Make 1956 Prosperous

with

Package Bees

Replace all winter loss and make increase with proven stock and dependable service.

Prices with regular queens

	2 lb.	3 lb.
1-24	$4.00 ea.	$5.00 ea.
25-99	3.75 ea.	4.75 ea.
100 or more	3.50 ea.	4.50 ea.

For Island Hybrid Queens add 25c each.

"They Produce"

Night shipment from junction of two main rail lines.

Rossman Apiaries

P. O. Box 133
Moultrie, Ga.

CAUCASIAN or ITALIAN

Package Bees and Queens for 1956

Gentle bees, less swarming, good producers, health certificate and live arrival guaranteed are just a few things you get when your requirements are sent to me. No extra charges on orders booked in advance.

	1-25	25-50	50-100
2-lb. pkg. w/q	$3.70	$3.45	$3.20
3-lb. pkg. w/q	4.60	4.30	4.00
4-lb. pkg. w/q	5.50	5.15	4.80
5-lb. pkg. w/q	6.40	6.00	5.60
Queens	1.20	1.10	1.00

FARRIS HOMAN
SHANNON, MISS.

WILLIAMS ITALIAN QUEENS
LARGE LEATHER-COLORED
THREE-BANDED
QUALITY SUPREME
CERTIFICATE WITH EACH SHIPMENT

1 - 9	Postpaid, Airmail	$1.00
10 -99	" "	.95
100-up	" "	.90

DR. WILLIAMS APIARIES
115 W. Sterling Ave. Baytown, Texas

HOLLOPETER'S ITALIAN QUEENS
Young Laying Queens .....$1.00 each
Return Mail
WHITE PINE BEE FARMS
Box 810 ROCKTON, PA.

HELP WANTED

WANTED — Expert beekeeper—permanent position. Farr, 4851 Paddock Road, Bond Hill, Cincinnati, Ohio.

WANTED—A good reliable man for a few months, or a permanent position for the right man. Weaver Apiaries, Navasota, Texas.

YOUNG MARRIED MAN. Season begins March 1st. House and garden furnished. Give qualifications and wages expected in first letter. Proper party will have opportunity to purchase my profitable modern 1000 colony honey and pollinating business. H. A. Schaefer, Osseo, Wisconsin.

WANTED—Man with understanding of bees to sell bee supplies from retail department. The A. I. Root Co.,, Medina, O.

WANTED: Experienced man for honey production in Minnesota. Could start season in my Louisiana apiary. Lionel Hopkins, Maringouin, La.

WANTED apiary and packing plant help. Experience desirable but not essential. Excellent wages, bonus, other advantages. Schultz Honey Farms, Ripon, Wisconsin.

QUEEN BREEDER WANTED for 1956 season. Year-round employment if desired. Write Box CB, c/o Gleanings in Bee Culture, Medina, Ohio.

POSITION WANTED

POSITION WANTED. Beeman able and reliable will work for reasonable salary. All replies answered. Box 156, Gleanings, Medina, Ohio.

MAGAZINES

Know interesting facts concerning the bees of India through the INDIAN BEE JOURNAL, published in English by the Bhupen Apiaries (Himalayas), Ramgarrh Dist. Naini Tal, U. P. India, or available through them. Subs. Rs9/ or 15 shillings or $2.25 yearly. Sample copy post free for Rs1/8/, or s2/6, or 40 cents (International Money Order). Payment in mint postage stamps of your country accepted.

Archiv fur Bienenkunde, International journal for Bee Culture and beekeeping economics Founded in the fall of 1918. Oldest economic bee journal in the world. Praised again and again for its decades of independent leadership through many endorsements and advice as a valuable source also for the practice. Classic. Yearly DM 5.50. Any aspiring beekeeping friend will receive a sample copy. Biene-Verglag, Giebelbach, Lindau, Germany.

BEE WORLD, the international journal of the Bee Research Association, published monthly, contains the latest research reports on bees and beekeeping. With Apicultural Abstracts it costs $3.00 per annum. Apicultural Abstracts only $1.75 per annum from the Hon. Subscription Secretary, Bee Research Association, 10 Barnett Wood Lane, ASHTEAD, Surrey, England.

Read the South African Bee Journal. Published every two months. Subscription 7/6 per year to the Treasurer, P. O. Box 3306, Cape Town, South Africa.

DO YOU FIND it difficult to secure information about sheep and sheep ranching methods? The SHEEP AND GOAT RAISER reaches more sheepmen with more information on range sheep than any other magazine published. Subscription $1.00. Hotel Cactus, San Angelo, Texas.

You'll get
BETTER BEES & QUEENS
From these members of
The American Bee Breeders' Ass'n.

Alamance Bee Company — La Belle, Fla. and Graham, N. C.
Bessonet Bee Company — Donaldsonville, La.
E. J. Bordelon Apiaries — Moreauville, La.
J. M. Cutts & Sons — Shipley, Fla.
Jackson Apiaries — P. O. Box 58 — Funston, Ga.
Jensen's Apiaries — Macon, Miss.
Little's Apiaries — P. O. Box 122 — Shelbyville, Tenn.
The Puett Company — Hahira, Ga.
Rossman Apiaries — P. O. Box 133 — Moultrie, Ga.
Stover Apiaries — Mayhew, Miss.
Sunkist Bee Co. — Convent, La.
Weaver Apiaries — Navasota, Texas
Wicht Apiaries — 406 Miller St. — Hattiesburg, Miss.
Wilbanks Apiaries — Claxton, Ga.
York Bee Company — Box 300 — Jesup, Ga.

"HIGH QUALITY IS **ALWAYS** A BARGAIN"

THREE-BANDED ITALIAN BEES AND QUEENS
Extra good workers and very gentle to handle. Dadant's Starline Hybrids bred for the best of honey production.

STARLINE QUEENS			OUR REGULAR STRAIN		
1-25	25-100	100-up	1-25	25-100	100-up
$1.60	$1.50	$1.40	$1.30	$1.20	$1.10

Shipment starts any time after Feb. 1st. Write for package bee prices.
ALAMANCE BEE COMPANY **La Belle, Fla.**

TOO LATE TO CLASSIFY

WANTED—Two experienced bee men, year-round work or seasonal. (Reference please.) Jim's Valley Apiaries, Sunnyside, Wash., James E. Bunch.

WANTED—Reliable man for 1956 queen and package season. Howard Weaver, Navasota, Texas.

WANTED—An experienced man to operate established bee business on shares in one of the Western States. Weaver Apiaries, Navasota, Texas.

JUST NEWS

(Continued from page 117)

lems of production and apiary management.

The association voted to invite the **Eastern Apicultural Society** (embracing the Northeastern states) to its 1957 meeting at University Park.

FLOOD-PROOF ATM. FEEDER

Made of galvanized iron. Will use either half gallon or gallon jugs with screw caps. By actual test Flood-Proof regardless of temperature changes. Eliminates robbing as syrup odors cannot escape and bees will not drown. Flow controlled by revolving jug with several feeding speeds. Ideal for stimulative or sulfa feeding.
Price $2.00 each, jug not included. Mailing weight 1 pound postage to be added.

FLOYD NORPEL
403 No. 5th St., Bellevue, Iowa

Protect Your Future. Buy Your Savings Bonds Now.

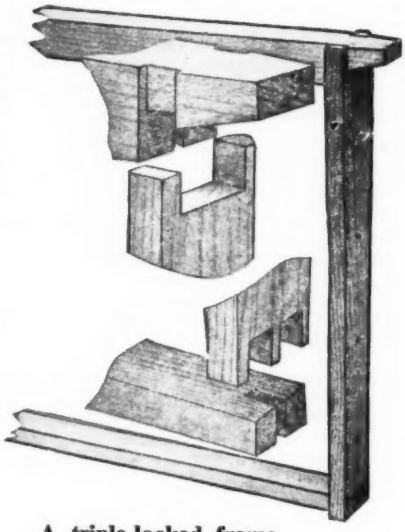
How a **Public Enemy** Was Finally Subdued

Villain Caused Big Losses To Beekeepers

THOUSANDS of dollars in damage to frames have resulted from the fights between beekeepers and their notorious public enemy: **Propolis.** Many a tug-of-war has ended with the beekeeper holding the short end of the frame.

Warm weather softens propolis which greedily grabs onto frames. Poorly constructed ones succumb to the sticky pull of soft propolis. . . .it takes a Root triple-locked frame to resist. The easily assembled, precision built triple-locked frame can be put together so tightly that it will resist the clutches of propolis. When properly nailed or glued this frame will last for years.

Get a supply of these propolis-resisting frames now. Order them from a Root dealer or directly from our nearest factory or branch. See for yourself why Root triple-locked frames have succeeded in reducing the destruction of propolis: **The public enemy of beekeeping.**



A triple-locked frame

The A. I. Root Company

Medina, Ohio **Council Bluffs, Iowa** **San Antonio, Texas**

Distributors in Principal Cities

Dealers Everywhere

THREE-BAND and PURE THREE-WAY D. R. ITALIAN PACKAGE BEES and QUEENS

We ship pure worker bees by mail, express, or truck. We guarantee live arrival. We ship you the package with the queen introduced or regular caged in the package, whichever you like.

1956 Prices — Each with a Young Laying Queen

Each	2-Pound	3-Pound	4-Pound	5-Pound
1 to 11	$4.00	$5.00	$6.00	$7.00
12 to 29	3.80	4.75	5.70	6.65
30 or more	3.60	4.50	5.40	6.30

Untested Queens, each, $1.35; Tested queens, each $2.00

If queenless bees are wanted, deduct $1.35 from the package price.

JACKSON APIARIES P.O. Box 58 FUNSTON, GEORGIA U.S.A.

THREE-BANDED ITALIAN PACKAGE BEES AND QUEENS

Shipped Anywhere in United States and Canada

1956 Prices F.O.B. Hampton, S. C.	Queens (each)	2-lb. & Queen	3-lb. & Queen	4-lb. & Queen	5-lb. & Queen
1 -24 pkgs.	$1.15	$3.75	$4.75	$5.75	$6.75
25 -99 pkgs.	1.05	3.50	4.50	5.50	6.50
100-up pkgs.	1.00	3.25	4.25	5.25	6.25

(For Queenless Packages Deduct Price of Queen)

Guaranteed safe arrival.
Health certificate with each shipment.
Queens clipped and painted if desired.
Shipper rated in Dun & Bradstreet.

TERMS: One-third with order, balance 10 days before shipment.

H. C. BRUNSON

P.O. Box 188 HAMPTON, SOUTH CAROLINA Phones: 2161 or 4581

PACKAGE BEES "GULF BREEZE" ITALIAN QUEENS

We are now booking orders for our good GULF BREEZE packages and queens. Orders accepted for booking without deposit, or obligation pending the release of prices. Remember that GULF BREEZE stock is bred for both COMB and EXTRACTED honey production.

BESSONET BEE COMPANY **Donaldsonville, La.**

HONEY PRODUCTION FOR SMALL BEEKEEPER

(Continued from page 111)

super for storing surplus.

Often a shallow super carrying extracting comb is used to start the bees to storing in the supers and once storing starts, the super is lifted and one or more section supers are added beneath it. The one problem to overcome is getting the bees in the supers rather than to prepare for swarming.

The **advantages** gained by comb honey production are better price per pound, greater ease of marketing, and cheaper equipment. The **disadvantages** are reduced production, increased difficulty of swarm control, more difficulty in manipulating supers, and greater care in taking off and handling the comb honey.

BEES QUEENS

The rearing of good Italian queens and bees is our only business.

46 Years' Experience

A Young Laying Queen with Each Package

	1 to 9	10-48	49 or more
2-lb. pkg.	$4.00	$3.75	$3.50
3-lb. pkg.	5.00	4.75	4.50
Queens	1.35	1.25	1.15

For larger packages, add $1.00 per pound. Young laying queens. Packages are full weight, young bees. Health certificate with each shipment.

PROMPT SERVICE

W. E. PLANT

Hattiesburg, Mississippi

Protect Your Future. Buy Your Savings Bonds Now.

HARPER'S FAMOUS
High Quality Italian
Package Bees & Queens
More & Better Bees for 1956
Send your requirements in early
CARLUS T. HARPER
NEW BROCKTON, ALA.

BETTER BRED QUEENS
THREE-BANDED ITALIANS

	Queens	2-lb. w/q	3-lb. w/q
1-24	$1.35	$4.00	$5.00
25-up	1.15	3.50	4.50

Please book orders early as there is a great shortage of bees this year.
CALVERT APIARIES Calvert, Ala.

ITALIAN BEES AND QUEENS

2-lb. pkg. with queen	$2.90
3-lb. pkg. with queen	3.50
4-lb. pkg. with queen	4.25
5-lb. pkg. with queen	5.10
Extra queens	.85
Tested queens	1.50

Live delivery guaranteed and health certificate with each shipment. 10% books your order, balance 10 days before shipping date.
GASPARD BEE CO. Hessmer, La.

Caucasian QUEENS	1-99	Italians 100-up
2-lb. pkg. w/q	$3.35	$3.25
3-lb. pkg. w/q	4.35	4.25
Queens	1.25	1.15

CLARK'S APIARIES
Bunkie, La.

FRAMEWORK Strain ITALIANS
Genetically bred for six outstanding, desirable factors. All Breeder queens progeny - tested.

	1-24	25-99	100-up
QUEENS	$1.00	$ .95	$ .90
2-lb. pkg. w/q	3.15	3.00	2.90
3-lb. pkg. w/q	4.15	4.00	3.90

BOB GALE'S APIARIES
Box 472 Bunkie, La.

1956 QUEEN BEES
3-Banded Italians
1-24 ..... $1.20 each
25 or more ..... 1.10 each
Geo. W. Moore
Shasta, Shasta Co., California

FOR SALE
THE J. W. REITZ & BROS.
Honey Processing and Packing Plant
Doing a prosperous business since 1925. Sale necessary, at a sacrifice, due to death of one of the partners. Plant located in central part of Florida.
Address: **J. W. Reitz & Bros.**
Summerfield, Florida

LET'S TALK ABOUT HONEY PLANTS

(Continued from page 113)

(Prosopis pubescens) was formerly a good honey plant but has been cut down for fence posts and is no longer common enough to yield a surplus.

Ontario. Mr. J. N. Dyment of Smithville writes me that his most important honey plant is alfalfa and that in 1951 he made a surplus of 360 pounds of alfalfa from one hive and that he averages 75 pounds in good seasons. He adds, "We had the biggest season in '51 of our entire beekeeping career, an average of 200 pounds all from alfalfa. This is difficult to understand because it was by no means a hot season which we had always considered necessary for a big production from alfalfa. It produces best in the afternoon."

Pennsylvania. Albert Reiner of Parryville writes that on June 1 he observed his bees working mountain laurel for the first time. Since the honey from the laurel has been proven to be poisonous, it is fortunate that this shrub is not visited regularly in this state where it blooms in great profusion in May and June. Several times I have driven through the mountainous western part of Pennsylvania in early June when the mountain laurel was in full bloom around all the hill sides. It is the most beautiful sight that I have ever seen—too bad it is not a good honey plant.

FLOWERS' QUALITY ITALIANS
That stand test for honey-gatherers. Gentle; prolific. QUEENS BRED FROM HIVES MAKING 300-lbs. HONEY AND OVER. Fumagillin fed grafting and queen yards. HEALTH CERTIFICATE with each shipment. All packages F.O.B. Jesup.

QUANTITY	1-24	25-99	100-up
2-lb. pkg. w/q	$3.75	$3.50	$3.25
3-lb. pkg. w/q	4.75	4.50	4.25
4-lb. pkg. w/q	5.75	5.50	5.25
5-lb. pkg. w/q	6.75	6.50	6.25
QUEENS mated and laying	1.25	1.15	1.00
TESTED QUEENS	2.00		

Prompt live delivery guaranteed. Place orders now, early orders have priority.
FLOWERS BEE COMPANY
JESUP, GEORGIA U.S.A.

Buy U. S. Savings Bonds
They come in all sizes . . . .
and grow bigger every year.

YORK'S PACKAGE BEES AND QUEENS

The Preference of Leading Honey Producers

Your Choice of

DADANT'S Improved STARLINES or YORK'S Quality Bred ITALIANS

Fumidil B fed queen grafting yards, queen mating yards, and package bees at no extra cost.

PRICES WITH ITALIAN QUEENS

Quantity	1-24	25-99	100-up
2-lb. pkg.	$4.00	$3.75	$3.50
3-lb. pkg.	5.00	4.75	4.50
4-lb. pkg.	6.00	5.75	5.50
5-lb. pkg.	7.00	6.75	6.50
Queens	1.35	1.25	1.15

Reg. U.S. Pat. Off.

FOR DADANT'S IMPROVED STARLINES, add 25c each additional
FOR TESTED QUEENS, add $1.00 each additional
FOR QUEENLESS PACKAGES, deduct $1.00 each

FREE OFFER: On orders for Italian queens or packages of from 10 to 100, we will substitute 10% of the queens with Starlines at no additional charge if requested. Offer subject to availability.

Shipments are made FOB Jesup by express, parcel post, or your truck. Bees are certified bees from our own apiaries state registered and state inspected. If convenient small orders cash, and larger orders $1.00 deposit per package with balance payable two weeks prior to shipment.

YORK BEE COMPANY JESUP, GEORGIA
(The Universal Apiaries)
P. O. Box 300 412 W. Orange St. Phones: 3522, 3320

START OF BEEKEEPING EXTENSION WORK

(Continued from page 96)

at Raleigh was true. He was devoting his life to his fellow mountaineers and sacrificing himself for their spiritual as well as temporal welfare. He was the head of a school, Mars Hill College, which at this writing I understand is still there and greatly enlarged. Baptist in denomination, yet open to all who qualified in mental capabilities and Christian character in so far as the capacity of the small school would allow.

(to be continued)

The Picture Bee Magazine
If you are taking time to read, why not read the best? Condensed to save you time. Illustrated to give you pleasure.
Modern Beekeeping
Clarkson, Kentucky

GRAY CAUCASIANS
Quality Bees & Dependable Service
Mail Service is being discontinued at Bolling, Ala. **Note change in address.**
BOLLING BEE COMPANY
Route 4
GREENVILLE, ALABAMA

J. E. WING & SONS
42 Years Continuous Service
Italian Package Bees and Queens
Our Specialty
Knights Landing, Calif.

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The Only WEEKLY BEE Journal in the World
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Medina, Ohio

All 1955 Orders Filled Without Much Delay
Let Us Fill Your 1956 Orders.

2-lb. packages with queens	**$3.00 any number**
3-lb. packages with queens	**4.00 any number**
Untested queens	**1.00 any number**
Tested queens	**1.50 any number**
Larger packages, add	**1.00 per pound**

Delivered prices on request. Above prices are F.O.B. except queens which are delivered by mail. Italians only. Remember our 100% Satisfaction always good. If you need more information, write us please.

MERRILL BEE COMPANY P.O. Box 115, State Line, Miss.

JENSEN'S BEES & QUEENS
Choice of Two Out-standing Strains

Dadant's "Starline" 4-way Hybrids, resulting from the most exhaustive and scientific breeding program in operation in the U. S. today. We have been co-operators in the project from its beginning. You should try them for greater production as well as their other good qualities; you may be surprised.

"MAGNOLIA STATE" ITALIANS

Time-tested and proven good year after year by largest commercial producers in this and foreign countries.

Reg. U.S. Pat. Off.

Quantities	1-24	25-99	100-up	
2-lb. pkgs. w/qs	$4.00	$3.75	$3.50	For Hybrid queens in
3-lb. pkgs. w/qs	5.00	4.75	4.50	Pkgs. add 25c each
Starline Queens	1.60	1.50	1.40	—Clipped & Marked Free
"Magnolia" Italians	1.35	1.25	1.15	

We will feed Fumidil-B again this spring.

JENSEN'S APIARIES MACON, MISSISSIPPI U. S. A.

Quality Bred Italian Queens

Breeders selected from our Michigan Apiaries for High Production and Hardiness.

Qns. through Feb. and Mar. $1.25 ea.
" " April and May, 1.00 ea.
All queens shipped Air Mail.

WALTER D. LEVERETTE APIARIES

P.O. Box 364 Ft. Pierce, Fla.

DARK ITALIANS
As GOOD As the Best

Queens	2-lb. pkg.	3-lb. pkg.
1 to 10	**$1.35**	**$4.00**	**$5.00**
11 to 50	**1.25**	**3.75**	**4.75**
51 and up	**1.15**	**3.50**	**4.50**

Place your order early. The demand for good queens and packages will be larger than the supply.

WEAVER APIARIES
Navasota, Texas

WHAT TURNED ME SWEET ON DRY SUGAR

(Continued from page 83)

small space added by the feeding rim at hive temperature with negligible extra effort. With the food on top of the frames, worry about draft from the entrance is at a minimum. The tighter the inner cover is, the more even will be the temperature and the better the work. This is why we recommend a strip of felt or some comparable kind of insulation on top of the inner cover.

I also recommend leaving the opening to the sugar store at the rear of the hive to avoid possible entrance draft, but I occasionally forget myself and leave it at the front with no serious adverse effects.

By feeding dry sugar in this manner, the colony is able to hold its own and slowly build up, even under unfavorable weather conditions outside.

MOUNTAIN GRAY CAUCASIANS
Personally raised. Gentle good workers; winter well. Queens $1.25 each.
ELBERT S. CHILDS
201 Garden Ave. Knoxville 18, Tenn.

DADANT'S NEW IMPROVED STARLINE HYBRIDS and GARON'S THREE-BANDED ITALIANS

Share with others in the present favorable honey prices. Meet good prices with TOP PRODUCTION. A good way to accomplish this is to stock with NEW IMPROVED DADANT STARLINE HYBRIDS and GARON'S THREE-BANDED ITALIAN Package Bees and Queens.

Reg. U.S. Pat. Off.

	QUEENS		Package Bees With Queens		
	Italians	Starlines	2-lbs.	3-lbs.	4-lbs.
1 -24	$1.25	$1.60	$3.65	$4.60	$5.55
25 -99	1.20	1.50	3.55	4.50	5.45
100-up	1.15	1.40	3.45	4.40	5.35

— Add 25c per package for Starline Hybrid Queens —

Queens Clipped and/or marked, when desired, without extra cost.

GARON BEE COMPANY **Donaldsonville, La.**

PACKAGE BEES & QUEENS — "ITALIANS"

Wilbanks offers you tested stock proven for honey-producing ability and easy handling. Satisfied customers through the years assure you of the greatest value here.

— PRICES —	1-9	10-49	50-up
2-lb. pkg. with young laying queen	$4.00	$3.75	$3.50
3-lb. pkg. with young laying queen	5.00	4.75	4.50
4-lb. pkg. with young laying queen	6.00	5.75	5.50
Extra Queens	1.25	1.15	1.10

Shipments by Express, Parcel Post or your Truck.
Queen Yards and Package Bees Fed Fumidil-B.

Quality Does Not Cost — It Pays

THE WILBANKS APIARIES **Claxton, Georgia**

FEDERAL WORK IN APICULTURE

(Continued from page 75)

range projects, many beekeepers may not be familiar with its research. However, the industry can be thankful that the United States Department of Agriculture employs this group of specialists to deal with basic problems in beekeeping. The work now being done on bee diseases, pollination, and the breeding of bees will be of great benefit to man in future years.

CARNIOLAN and CAUCASIAN

Start the new year with young queens and be assured of plenty of bees when the honey flow starts. Carniolan and Caucasian build up rapidly, build white combs, are the gentlest of all races of bees. **Untested queens $1.30 each air mailed, $2.00 to foreign countries, discount on quantity. Ready Feb. 15th. Packages later, inquire.**

W. D. REAMS

Box 87 LaBelle, Fla.

Booking orders now. Over 30 years a shipper. Send for Free Circulars.

BLUE BONNET APIARIES
Weslaco, Texas

THE BEST BY TEST — FOR '56

JOHN M. DAVIS QUEENS
OUR SPECIALTY
1 to 25 ..... $1.00 each
26 up ..... .85 each

Phone: 466 R 5

O. K. ANDERSON & SON
Post Office Box 193
COFFEE SPRINGS, ALA. U. S. A.

PACKAGE BEES AND QUEENS
Three-banded Italians

	1 to 50	50 up
Queens	$1.10	$1.00
2-lb. pkg.	3.50	3.25
3-lb. pkg.	4.50	4.25

Live delivery guaranteed.
AUTAUGA BEE FARM
Owned and Operated by
J. H. Moody and W. L. Strength
Prattville, Ala.

Look for this Sign
When you Want
QUALITY AT LOW COST

Trade Mk. Reg.
U. S. Pat. Off.

KELLEY — "The Bee Man"

BEES and QUEENS

Three-banded Italian bees and KELLEY'S ISLAND improved hybrid queens direct from our own farm. Shipments start April 1st, express or parcel post shipment. Thousands of extra queens.

	Kelley Island Queens	2-lb. bees & K. I. queen	3-lb. bees & K. I. queen
1-24	$1.25 air mail	$3.50	$4.50
25-99	1.15 air mail	3.25	4.25
100-up	1.05 air mail	3.00	4.00

THE WALTER T. KELLEY CO. Clarkson, Ky.

QUEENS

Italians	1-24	25-99	100-up
2-lb. pkg. w/q	$3.25	$3.10	$3.00
3-lb. pkg. w/q	4.25	4.10	4.00
Nice large queens	1.05	1.00	.95

Caucasians

Send us your order of 1 or 1000

MITCHELL'S APIARIES
Bunkie, La.

"The Australian Bee Journal"
Published by the Victorian Apiarists' Association at the beginning of each month.
Subscription 10/-per annum plus 2/6 postage to overseas countries.
Box 167, Rainbow, Victoria, Australia

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